U.S. GEOLOGICAL SURVEY

MINERAL SUMMARIES for NEVADA

U.S. Bureau of Land Management Wilderness Study Areas

Edited by

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Prepared by the U.S. Geological Survey and the U.S. Bureau of Mines





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U.S. BUREAU OF LAND MANAGEMENT WILDERNESS STUDY AREAS IN NEVADA

Alder Creek 1. 2. Antelope Arrow Canyon 3. 4. Augusta Mountains 5. **Bad Lands** Black Rock Desert 6. Blue Eagle 7. Blue Lakes 8. 9. Bluebell 10. Bonelli Peak 11. **Buffalo Hills** Burbank Canyon 12. Calico Mountains 13. Carson Iceberg 14. 15. Cedar Ridge 16. China Mountain Clan Alpine Mountains 17. Clover Mountains 18. Cougar Canyon 19. 20. **Delmar Mountains** 21. Desatoya Mountains Disaster Peak 22. 23. Dry Valley Rim El Dorado Evergreen

East Fork High Rock Canyon 24.

25. 26. 27. Fandango Far South Egans 28. 29. Fish and Wildlife #1/2/3 30.

Five Springs 31. Fortification Range 32. Fox Range 33. Gabbs Valley Range

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Slinkard

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Wall Canyon 100. Weepah Spring 101. White Rock Range 102. Worthington Mountains 103. 104. Yellow Rock Canyon

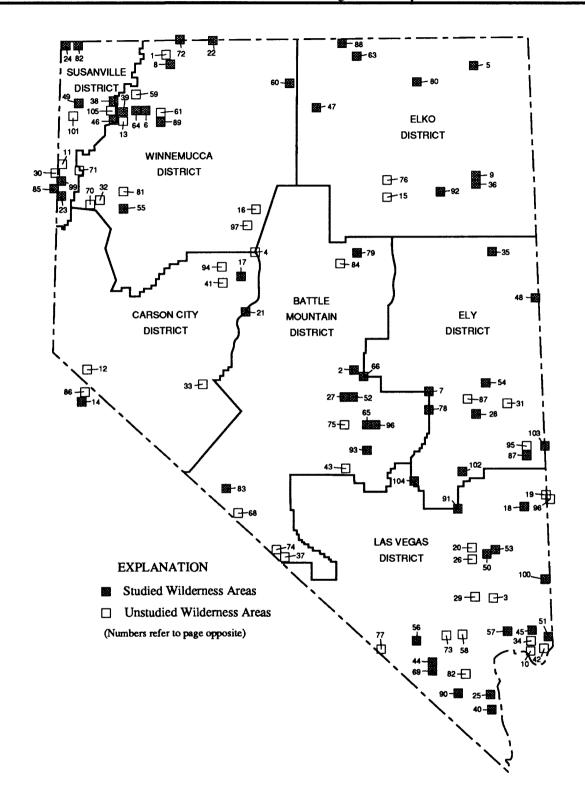


Figure 1. Map showing distribution and status of Bureau of Land Management wilderness study areas in Nevada.



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PLATE

[In pocket]

 Map showing identified resources and mineral resource potential in Nevada wilderness study areas

INTRODUCTION

The U.S. Geological Survey (Menlo Park, Calif.) in cooperation with the U.S. Bureau of Mines (Spokane, Wash., and Denver, Colo.) prepared this mineral "Briefing Book," that summarizes the mineral resource evaluations of 104 wilderness study areas in or administered from Nevada (fig. 1). These areas are lands administered by the U.S. Bureau of Land Management. All but two of these areas are classified as wilderness study areas; two exceptions are instant study areas. Interspersed throughout many of the federal lands are parcels of private and State land.

This volume covers a total of 5,362,256 acres. The mineral resource information was requested under the Federal Land Policy and Management Act (Public Law 94-579, October 21, 1976), which required the U.S. Geological Survey and U.S. Bureau of Mines to conduct mineral surveys on all or part of 62 areas to determine the mineral values, if any, that may be present. The U.S. Bureau of Land Management requested studies of wilderness study areas in and administered from Nevada, that totaled 3,604,797 acres. These consist of 9 areas that total 223,403 acres and parts of 53 areas that total 3,381,394. This briefing book additionally contains information on 3,153,056 acres that comprise the 42 remaining study areas that total 1,757,459 acres and the unstudied parts of 53 areas that total 1,395,597 acres. However, the mineral information on the areas that were not studied is tenuous and based on literature searches and, where applicable, discussions with private industry. Table 1 is a list of the U.S. Bureau of Land Management wilderness study areas covered in this volume, along with their number, acreages, and whether they were studied by the U.S. Geological Survey and the U.S. Bureau of Mines.

Format of Briefing Book

Each mineral summary in this book includes text describing the identified resources, mineral resource potential, mining activity, mineral setting, recommendations for further study, and references. Each summary also has a map showing significant mines and prospects in and near the wilderness study area, along with an indication of the potential for undiscovered resources. Identified resources and areas of high resource potential are shown in red; areas of moderate resource potential are shown in pink. Undiscovered resources are studied by the U.S. Geological Survey and identified mineral resources are studied by the U.S. Bureau of Mines.

Table 2 lists the study areas covered in this volume and shows those that have identified resources or areas of moderate or high mineral resource potential. Table 3 lists designated strategic and critical minerals and table 4 contains a list of mineral commodities in the wilderness study areas, their import reliance, major foreign sources, and principal uses. A geologic time chart (fig. 4) is included in the back of this book for reference.

Classification of Mineral Resources

According to Memorandum of Understanding, the U.S. Bureau of Mines is responsible for studying the known, or identified resources, and the U.S. Geological Survey is responsible for studying unknown, or the undiscovered resources of a study area. The resource classification used by the U.S. Bureau of Mines and the mineral resource classification used by the U.S. Geological Survey are presented in figures 2 and 3.

List of Measurement Abbreviations Used in This Book

ft	foot
1b	pound
lb/ton	pound per ton
Ma	million years
mi	mile
mi ²	square mile
OZ	troy ounce
oz/ton	troy ounce per ton
ppm	part per million
stu	short ton unit
yd^2	square yard
	cubic yard
yd ³ %	percent

Other Abbreviations Used in This Book

BLM	U.S. Bureau of Land Management
MILS	U.S. Bureau of Mines Mineral
	Industry Location System
MRDS	U.S. Geological Survey
	Mineral Resources Data System
USBM	U.S. Bureau of Mines
USFS	U.S. Forest Service
USGS	U.S. Geological Survey

MINERAL SUMMARY FOR THE STATE OF NEVADA

The State of Nevada has an impressive mineral weath. Nevada's nonfuel mineral production in 1987 ranked third nationally. The \$1.5 billion produced was an increase of \$470 million or 48 percent from that recorded in 1986. Nevada led the nation in the production of barite, gold, mercury, and silver and was the sole producer of mined magnesite. Gold was the leading commodity produced in terms of value, accounting for \$1.2 billion or more than 80 percent of the total nonfuel mineral value produced in the State. Nevada's gold production accounted for 54 percent of the total amount produced in the United States in 1987.

Industrial mineral production consisted of barite, clays, crushed stone, diatomite, fluorspar, gem stone, gravel, gypsum, lime, perlite, salt, and sand. Metal production included barite, copper, gold, iron, lithium, magnesite, mercury, and silver. (Data from U.S. Bureau of Mines Minerals Yearbook, 1987)

Many of the wilderness study areas in Nevada are near areas of mineral production; identified or known resources in the study areas are basalt, beryl, building stone, cinders, cobalt, copper, diatomite, dolomite, feldspar, gallium, geothermal energy, germanium, gold, gravel, gypsum, iron, lead, limestone, marble, mercury, mica, molybdenum, opal, perlite, phosphate, pozzolan, sand, silica, silver, tungsten, zeolites, and zinc. A total of 31 wilderness study areas have high potential for undiscovered resources of antimony, arsenic, calcium borates, clays, copper, gas, geothermal energy, gold, lead, limestone, lithium, mercury, molybdenum, oil, perlite, selenium, silver, tungsten, vanadium, zeolites, and (or) zinc. Seventy-one wilderness study areas have moderate potential for undiscovered resources of agate, antimony, arsenic, beryllium, bismuth, building stone, cadmium, cobalt, copper, feldspar, fluorite, gas, geothermal energy, gold, gravel, gypsum, iron, lead, lithium, manganese, mercury, mica, molybdenum, nickel, niobium, oil, opal, phosphate, pozzolan, rare earth elements, sand, silver, thorium, tin, tungsten, uranium, zeolites, and (or) zinc.

Table 1.--U.S. Bureau of Land Management wilderness study areas in Nevada, their numbers and acreages, and whether they were studied by the U.S. Geological Survey and the U.S. Bureau of Mines.

Area Name	Number	Acres	Studied
Alder Creek	NV-020-600D	5,142	no
Antelope	NV-060-231/241	87,400	partially
Arrow Canyon Range	NV-050-215	32,853	no
Augusta Mountains	NV-030-108	89,372	no
Bad Lands	NV-010-184	9,426	partially
Black Rock Desert	NV-020-620	319,594	partially
Blue Eagle	NV-060-158/199	59,560	partially
Blue Lakes	NV-020-600	20,508	partially
Bluebell	NV-010-027	55,665	partially
Bonelli Peak	NV-050-238	6,500	no
Buffalo Hills	CA-020-619	46,143	no
Burbank Canyon	NV-030-525A	13,395	no
Calico Mountains	NV-020-019	67,647	no
Carson Iceberg	NV-030-532	550	yes
Cedar Ridge	NV-010-088	10,009	no
China Mountain	NV-020-406P	10,358	no
Clan Alpine Mountains	NV-030-102	196,128	partially
Clover Mountains	NV-050-139	84,935	partially
Cougar Canyon (Tunnel Spring)	UT-040-123/NV-050-166	15,968	partially
Delamar Mountains	NV-050-177	126,257	no
Desatoya Mountains	NV-030-110	51,262	partially
Disaster Peak	OR-003-153/NV-020-859	31,490	partially
Dry Valley Rim	CA-020-615	94,308	partially
East Fork High Rock Canyon	CA-020-914/NV-020-006A	52,639	partially
El Dorado	NV-050-423	12,290	partially
Evergreen	NV-050-1R-16A/B/C	2,694	no
Fandango	NV-060-190	40,940	partially
Far South Egans	NV-040-172	53,224	partially
Fish & Wildlife #1/2/3	NV-050-201/216/217	50,334	no
Five Springs	CA-020-609	49,206	no
Fortification Range	NV-040-177	41,615	no
Fox Mountain Range	NV-020-014	75,404	no
Gabbs Valley Range	NV-030-407	79,600	no
Garrett Buttes	NV-050-235	11,835	no
Goshute Canyon	NV-040-015	35,594	partially
Goshute Peak	NV-010-033	69,770	partially
Grapevine Mountains (Bonnie Clair Flat)	NV-060-355	66,800	no

Table 1.--U.S. Bureau of Land Management wilderness study areas in Nevada, their numbers and acreages, and whether they were studied by the U.S. Geological Survey and the U.S. Bureau of Mines--continued.

Area Name	Number	Acres	Studied
High Rock Canyon	CA-020-913B	34,758	partially
High Rock Lake	NV-020-007	62,382	partially
Ireteba Peaks	NV-050-438	14,994	yes
Job Peak	NV-030-127	90,209	no
Jumbo Springs	NV-050-236	3,466	no
Kawich	NV-060-019	54,320	no
La Madre Mountains	NV-050-412	61,630	partially
Lime Canyon	NV-050-231	34,680	
Little High Rock Canyon	CA-020-913/NV-020-008	50,951	yes
Little Humboldt River	NV-010-132		partially
Little Humboldt River	N V-010-132	42,213	partially
Marble Canyon (Granite Springs)	NV-040-086	12,715	partially
Massacre Rim	CA-020-1013	101,290	partially
Meadow Valley Range	NV-050-156	185,744	partially
Million Hills	NV-050-233	21,296	partially
Morey	NV-060-191	20,120	partially
Mormon Mountains	NV-050-151	162,887	
Mount Grafton	NV-040-169	The second secon	partially
Mount Limbo		73,216	partially
	NV-020-201	23,702	partially
Mount Stirling	NV-050-401	69,650	partially
Muddy Mountains	NV-050-229	96,170	yes
Nellis	NV-050-4R-15	5,718	no
North Black Rock	NV-020-622	30,191	no
North Fork Little Humboldt River	NV-020-827	69,683	partially
North Jackson Mountains	NV-020-606	26,457	no
North McCullough Mountains	NV-050-425	46,166	no
Owyhee Canyon	NV-010-106	21,875	partially
Pahute Peak	NV-020-621	57,529	
Palisade Mesa	NV-060-142/162	99,550	partially
Park Range	NV-040-154		partially
I aik Kange	11 4 -040-134	47,268	partially
Parsnip Peak	NV-040-206	88,175	partially
Pigeon Spring	NV-050-350	3,575	no
Pine Creek	NV-050-414/NV-000-ISA2	24,618	yes
Pole Creek	NV-020-014A	12,969	no
Poodle Mountain	NV-020-012	142,050	no
Pueblo Mountains	NV-020-642/OR-002-081	69,310	partially
Quail Springs	NV-050-411	12,145	
			no
Queer Mountain	NV-060-354	81,550	no
Rawhide Mountain	NV-060-059	64,360	no
Red Spring	NV-010-091	7,847	no

Table 1.--U.S. Bureau of Land Management wilderness study areas in Nevada, their numbers and acreages, and whether they were studied by the U.S. Geological Survey and the U.S. Bureau of Mines--continued.

Area Name	Number	Acres	Studied
Resting Springs Range	NV-050-460	3,850	no
Riordan's Well	NV-040-166	57,002	partially
Roberts	NV-060-541	15,090	yes
Rough Hills	NV-010-151	6,685	yes
Selenite Mountain	NV-020-200	32,041	no
Sheldon Contiguous	CA-020-1012	23,700	partially
Silver Peak Range	NV-060-338	33,900	partially
Simpson Park	NV-060-428	49,670	no
Skedaddle	CA-020-612	62,011	partially
Slinkard	CA-010-105/NV-030-531	6,350	no
South Egan Range	NV-040-168	96,916	no
South Fork Owyhee River	NV-010-103A	7,842	partially
South Jackson Mountains	NV-020-603	60,211	partially
South McCullough Mountains	NV-050-435	56,623	partially
South Pahroc Range	NV-050-132	28,600	partially
South Pequop	NV-010-035	41,090	partially
South Reveille	NV-060-112	106,200	partially
Stillwater Range	NV-030-104	94,607	no
Table Mountain	NV-040-197	35,958	no
The Wall	NV-060-163	38,000	partially
Tobin Range	NV-020-406Q	13,107	no
Tunnel Spring (Cougar Canyon)	NV-050-166/UT-060-123	15,968	partially
Twin Peaks	CA-020-619A	90,791	partially
Virgin Mountain	NV-000-ISA	6,560	yes
Wall Canyon	CA-020-805	46,305	no
Weepah Spring	NV-040-246	61,137	partially
White Rock Range	NV-040-202/UT-040-216	24,065	yes
Worthington Mountains	NV-040-242	47,633	partially
Yellow Rock Canyon	CA-020-913A	12,468	no

Table 2.--U.S. Bureau of Land Management wilderness study areas in Nevada with identified resources (known) or with high or moderate mineral resource potential (undiscovered).

The man bear of the	Indilloci	Identified Resources (Known)	Mineral Resource	Milleral Resource Folential (undiscovered)
			High	Moderate
Alder Creek	NV-020-600D NV-060-231/241	none	silver, molybdenum, zinc.	pold, silver
adomin			selenium, vanadium	Bottel attack
Arrow Canyon Range	NV-050-215	none		oil, gas, silica, clay, gypsum, diatomite, limestone, sand, gravel
Augusta Mountains	NV-030-108	none		sold, mercury, manganese, geothermal
Bad Lands	NV-010-184	none		
Black Rock Desert	NV-020-620	none		gold, silver, mercury, lithium,
Blue Eagle	NV-060-158/199	none	oil, gas	geothermal gold, silver, molybdenum, copper, lead, zinc. antimony
Blue Lakes	NV-020-600	попе		
Bluebell	NV-010-027	gold, limestone	gold, limestone	gold, phosphates
Bonelli Peak	NV-050-238	none		gold, silver, copper, lead, zinc, beryllium, feldspar, mica
Buffalo Hills	CA-020-519	none		gold, silver, copper, lead, zinc, clay, zeolites, nozzolan
Burbank Canvon	NV-030-525A	попе	gold, silver, lead, zinc,	
			tungsten, copper, molybdenum	
Calico Mountains	NV-020-019	none		gold, silver, geothermal
Carson Iceberg	NV-030-532	попе		
Cedar Ridge	NV-010-088	none	oil, gas	
China Mountain	NV-020-406P	none		
Clan Alpine Mountains	NV-030-102	none	gold, silver	gold, silver, molybdenum, antimony
Clover Mountains	NV-050-139	none	molybdenum	
Cougar Canyon (Tunnel Spring)	UT-040-123/NV- 050-166	none		
Delamar Mountains	NV-050-177	none		
Desatova Mountains	NV-030-110	none		gold, silver
Disaster Peak	OR-003-153/NV- 020-859	none	plog	
Dry Valley Rim	CA-020-615	zeolites, perlite		zeolites
East Fork High Rock Canyon	CA-020-914/NV-	none		gold, silver, mercury, zeolites
El Dorado	NV-050-423	gold, silver, lead, zinc, sand,	gold, silver, copper, lead, zinc,	gold, silver, copper, lead, zinc,

Table 2,--U.S. Bureau of Land Management wilderness study areas in Nevada with identified resources (known) or with high or moderate mineral resource potential (undiscovered)--continued.

Wilderness Study Area	Number	Identified Resources (known)	Mineral Resource	Mineral Resource Potential (undiscovered)
			High	Moderate
Evergreen	NV-050-1R-16A/B/C	none		
Fandango	NV-060-190	silver, lead, zinc	gold	silver, lead, zinc
Far South Egans	NV-040-172	limestone, silica, sand, gravel		gold, molybdenum, cadmium, lead, zinc
Fish & Wildlife #1/2/3	NV-050-201/216/	sand, gravel		oil, gas
Five Springs	CA-020-609	clav	clay	
Courtification Dance	771-040-VN	9404		
Fornification Nange	NIV 000 014	CHOIL		and the second second second
rox Mountain Kange Gabbs Valley Range	NV-030-407	manganese		gold, silver, manganese, mercury,
				antimony
Garrett Buttes	NV-050-235	none		gold, beryllium
Goshute Carryon	CTO-OLO-INI	2000		zinc, tungsten
Goshute Peak	NV-010-033	limestone	limestone	
Grapevine Mountains (Bonnie Clair Flat)	NV-060-355	none		gold
High Rock Canyon	CA-020-913B	none	zeolites	gold, silver, mercury
High Kock Lake	NV-020-001	geometimal		The last second and the last
releva reaks	NV-030-127	and anti-		sold eilver
Jumbo Carings	NV-050-236	0000		sold lead zing hervilium
Kawich	NV-060-019	none		gold, silver
La Madre Mountains	NV-050-412	none		
Lime Canyon	NV-050-231	gypsum, limestone, dolomite, sand, gravel		
Little High Rock Canyon	CA-020-913/NV- 020-008	none		gold, silver
Little Humboldt River	NV-010-132	none	gold, zeolites	gold, zeolites
Marble Canyon	NV-040-086	limestone, marble	limestone, marble	marble, barite, oil, gas
Massacre Rim	CA-020-1013	none		gold, silver, mercury, uranium
Meadow Valley Range	NV-050-156	perlite, zeolites, sand, gravel, stone, silica, limestone	vanadium, perlite, limestone, sand, gravel	tin, zeolite, agate, marekanite, opal
Million Hills	NV-050-233	gold, silver, copper, lead, zinc, cobalt, gallium, germanium		gold, silver, copper, cobalt, lead, zinc, uranium, thorium, rare earth
Morev	NV-060-191	silver, lead, zinc	silver, lead, zinc	elements silver, lead, zinc
Mormon Mountains	NV-050-161	none	gold, silver, copper, lead, zinc,	tungsten, molybdenum, tin, antimony,

Table 2.--U.S. Bureau of Land Management wilderness study areas in Nevada with identified resources (known) or with high or moderate mineral resource potential (undiscovered)--continued.

Wildemess Study Area	Number	Identified Resources (known)	Mineral Resour	Mineral Resource Potential (undiscovered)
			High	Moderate
Mount Grafton	NV-040-169	tungsten, zinc	tungsten, copper, zinc	gold, silver, lead, tungsten, zinc, fluorite
Mount Limbo	NV-020-201	none		gold, silver
Mount Chirling	NV-050-401	911011	pold	9014
Mount Juning	NV 050 220	velites clav	calcium horates lithium	hailding stone cilion
M daay Mountains	677-0C0-AN	collics, clay	Calcium Colacco, manum	building storie, sinca
Nellis	NV-050-4R-15	none		gold, silver, lead, zinc, oil, gas
North Black Rock	NV-020-622	none		geothermal
North Fork Little Humboldt River	NV-020-827	none		
Mosth Tookson Mountains	NO 000 606	favera bus mori		and silver corner lead river
North McCullough Mountains	NV-050-425	non, sand, graver		gold, sirver, copper, lead, fille, non
Owvhee Canvon	NV-010-106	none		
Pahute Peak	NV-020-621	none	gold, silver, geothermal	gold, silver, copper, lead, zinc,
Dolisade Mess	NV-060-142/162	cinders		more aminer and security
Don't Dange	NV-040-154	none		old silver merciny arsenic
Parsnip Peak	NV-040-206	perlite	gold, mercury, arsenic,	perlite
	030 030 111		Correction	11.7
Figeon Spring Pine Creek	NV-050-414/NV-	none		gord
Pole Creek	NV-020-014A	none		gold, silver, lead
Poodle Mountain	NV-020-012	none		
Pueblo Mountains	NV-020-642/OR-	gold, copper, molybdenum,	silver, mercury	gold, silver, mercury, copper,
	002-081	geothermal, sand, gravel, stone		molybdenum
Ouail Springs	NV-050-411	none		sand, gravel
Oueer Mountain	NV-060-354	none		gold, silver
Rawhide Mountain	NV-060-059	none		silver, lead, zinc
Red Spring	NV-010-091	none	oil, gas	
Resting Springs Range	NV-050-460	none	clay	geothermal
Riordan's Well	NV-040-166	none	oil, gas	gold, silver, copper, lead, zinc, molybdenum, bismuth
Roberts	NV-060-541	none	gold, silver	gold, silver
Rough Hills	NV-010-151	plog		

Table 2.--U.S. Bureau of Land Management wilderness study areas in Nevada with identified resources (known) or with high or moderate mineral resource potential (undiscovered)--continued.

Wilderness Study Area	Number	Identified Resources (known)	Mineral Resource	Mineral Resource Potential (undiscovered)
			High	Moderate
Selenite Mountain	NV-020-200	none		geothermal
Sheldon Contiguous	CA-020-1012	none		
Silver Peak Range	NV-060-338	none	gold, silver	gold, silver
Simpson Park	NV-060-428	none		
Skedaddle	CA-202-612	perlite	gold, silver, mercury, antimony	gold, silver, mercury, antimony, perlite, geothermal
Slinkard	CA-010-105/NV- 030-531	none		
South Egan Range	NV-040-168	none	tungsten, copper, zinc	gold, silver, lead, zinc, molybdenum, cadmium, fluorite, oil. gas
South Fork Owyhee River	NV-010-103A	opal, gold, sand, gravel, building stone		
South Jackson Mountains	NV-020-603	none		gold, silver, copper, lead, zinc, iron
Sount McCuilough Mountains	000000			uranium, thorium, niobium, rare
South Pahroc Range	NV-050-132	perlite		gold
South Pequop	NV-010-035	phosphate		gold, silver, lead, zinc, copper,
South Reveille	NV-060-112	none		gold, silver
Stillwater Range	NV-030-104	none	gold	gold, silver, copper, tungsten
Table Mountain	NV-040-197	none		gold, silver, uranium
The Wall	NV-060-163	basalt, cinders		
Tunnel Spring (Cougar Canyon)	NV-020-406Q NV-050-166/UT- 060-123	mercury, sand, gravel none		
Twin Peaks	CA-020-619A	pozzolan		blog
Virgin Mountain	NV-000-ISA	tungsten, feldspar, gypsum,		gold, silver, tungsten, copper, nickel,
		limestone, mica, beryl		gypsum, feldspar, mica, beryllium
Wall Canyon	CA-020-805	none		gold, silver, mercury, uranium, lithium, zeolites, clay, pozzolan
Weepah Spring	NV-040-246	silver	gold, mercury	gold, silver, copper, lead, zinc
White Rock Range	NV-040-202/UT- 040-216	none		
Worthington Mountains	NV-040-242	silver, lead, zinc, copper		gold, silver, copper, lead, zinc,
Yellow Rock Canyon	CA-020-913A	none		gold, silver, mercury, uranium, lithium,

Table 3.--Mineral Commodities designated strategic and critical

-	A 4		TT2	
	A line	M1111	100/120	DITTI
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- 2. Antimony*
- 3. Asbestos
- 4. Beryllium/Beryl*
- 5. Bismuth*
- 6. Cadmium*
- 7. Chromium/Chromite
- 8. Cobalt*
- 9. Columbium (Niobium)*
- 10. Copper*
- 11. Diamond
- 12. Fluorspar*
- 13. Germanium*
- 14. Graphite
- 15. Lead*
- 16. Manganese*

- 17. Mercury*
- 18. Mica*
- 19. Molybdenum*
- 20. Nickel*
- 21. Platinum (iridium,

platinum, palladium)

- 22. Quartz crystals
- 23. Rutile
- 24. Sapphire/Ruby (Corundum)
- 25. Silver*
- 26. Talc
- 27. Tantalum
- 28. Thorium*
- 29. Tin*
- 30. Tungsten*
- 31. Vanadium*
- 32. Zinc*

^{*}Indicates commodities that are identified or have moderate or high mineral resource potential in wilderness study areas in Nevada.

	Metals and Minerals	Major Foreign Sources	Principal Uses
Net Exports			
	Clays	United Kingdom, Mexico, Canada	Paper, refactories, pottery, title fire bricks, foundry sand, drilling mud, absorbent uses, construction materials
	Diatomite	Taiwan, Mexico	Filter aid (67%), fillers (17%)
	Feldspar	Mexico, Venezuela	Glass (54%), pottery (46%)
	Lithium	Chile, Zimbabwe, Canada	Ceramics and glass (40%), aluminum products and lubricants (45%)
	Magnesium (dolomite)	Canada, Norway	Aluminum-base alloys (53%), magnesium castings (23%)
Dogg 12	Molybdenum	Canada, Mexico, Chile Federal Republic of Germany	Machinery (30%), oil and gas industry (15%), transportation (15%), chemical (15%), electrical (15%)
	Phosphate Rock	Morocco, Republic of Togo, Netherlands, Antilles	Fertilizer (92%), chemicals (8%)
	Rare-earth metals and yttrium	Monazite: Australia, Malaysia	Petroleum catalysts (36%), metallurgical uses (31%), ceramic and glass (29%)
	Sand and gravel	Canada, Australia, Antigua	Construction sand and gravel: concrete aggregate (28%), road base (15%), asphalt (10%) Industrial sand and gravel: glass (40%), foundry (21%), abrasive (7%)
	Talc and pyrophyllite	Canada, Italy, France	Talc: ceramics (35%), paints (17%), paper (13%), roofing (11%), pyrophyllite: ceramics (55%), refractories (17%), insecticides (11%)

Table 4.--Percent of U.S. consumption from imports, major foreign sources, and principal uses for mineral commodities identified in Nevada wilderness study areas--

	Metals and Minerals	Major Foreign Sources	Principal Uses
0-25 Pe	0-25 Percent Net Import Reliance		
	Beryllium	China, Brazil, Republic of South Africa, Switzerland	Alloy and oxides in electrical equipment and components (56%), nuclear reactors and aerospace (22%)
	Cement	Canada, Mexico, Spain	Ready-mix concrete (72%), concrete products (12%)
	Соррег	Chile, Canada, Peru	Construction (42%), electrical and electronic (24%)
	Gold	Canada, Switzerland (mostly Republic of South Africa origin), Uruguay	Jewelry and arts (59%), electronic (33%), dental (8%)
	Lead (metal)	Canada, Mexico, Australia, Peru	Transportation with 70% in batteries and gasoline additives
	Perlite	Greece	Building construction (70%), filter aid (12%)
	Stone (crushed)		Construction aggregate (63), cement and lime (11%); of the crushed stone, 72% was limestone-dolomite; 15% granite
26-50 I	26-50 Percent Net Import Reliance		
	Gypsum	Canada, Mexico, Spain	Industrial and building plaster (77%), cement and agriculture (20%)
	Iron ore	Canada, Venezuela, Liberia, Brazil	Blast furnaces (97.6%), steel furnaces (0.3%)
	Selenium	Canada, United Kingdom, Japan, Belgium	Electronic and photo copiers (35%), chemical (28%), glass (25%)
	Stone (dimension)	Italy, Canada, Spain	Building construction (47%), monuments (26%), rubble (14%); of the total, 55% was granite, 25% limestone, 11% sandstone

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continued.		
Metals and Minerals	Major Foreign Sources	Principal Uses
51-90 Percent Net Import Reliance		
Barite	China, Morocco, India	Weighting agent in drilling muds (65%), paints and rubber
Cadmium	Canada, Australia, Mexico Federal Republic of Germany	Coating and plating (30%), batteries (30%), pigments (20%)
Fluorspar	Mexico, Republic of South Africa	Hydrofluoric acid (70%), steelmaking (25%)
Nickel	Canada, Australia, Norway, Botswana	Stainless and alloy steel (39%), nonferrous alloys (28%), electroplating (22%)
Platinum-group metals	Republic of South Africa, United Kingdom, USSR	Automotive (42%), electrical and electronic (20%), dental and medical (20%)
Potash	Canada, Israel	Fertilizer (95%), chemical industry (5%)
Silver	Canada, Mexico, Peru, United Kingdom	Photography (45%), electrical and electronic (26%), electroplating and jewelry (13%)
Tin	Thailand, Brazil, Indonesia, Bolivia	Electrical (20%), cans and containers (17%) construction (16%), transportation (14%)
Tungsten	Canada, China, Bolivia	Metalworking (76%), lamps and lighting (11%), electrified machinery (10%), transportation (9%)
Zinc	Canada, Peru, Mexico, Honduras	Construction materials (50%), transportations (23%), machinery (12%), electrical (10%)
Greater Than 91 Percent Net Import Reliance	nce	
Manganese	Republic of South Africa, Gabon, Australia, Brazil, France	Manganese ferroalloys, dry cell batteries, chemicals
Tantalum	Thailand, Australia, Brazil	Electronic components (59%), machinery (19%), transportation (15%)
Thallium	Belgium, Netherlands, United Kingdom, Federal Republic of	Electronics (70%)

Table 4.--Percent of U.S. consumption from imports, major foreign sources, and principal uses for mineral commodities identified in Nevada wilderness study areas--

Metals and Minerals	Major Foreign Sources	Principal Uses
Net Import Data Withheld		
Antimony	Bolivia, China, Mexico, Republic of South Africa, France	Flame retardants (65%), batteries (10%) chemicals (10%), ceramics and glass (5%)
Bismuth	Peru, Mexico, United Kingdom, Belgium	Pharmaceuticals (50%), machinery (22%), primary metals (26%)
Mercury	Spain, Algeria, Turkey,	Electrical (51%), chlorine productions (19%), paints (11%)
Tellurium	Canada, Philippines, United Kingdom	Iron and Steel production (60%), nonferrous metals (25%), chemicals (10%)
Thorium	France, Netherlands, Canada, Australia, United Kingdom	Nuclear fuel, incandescent lamp mantles, alloys, refractories, ceramics, welding electrodes
Vanadium	Republic of South Africa, European Communities, Canada	Alloying agent for iron and steel
Minerals not listed in Mineral Commodity Summaries		
Uranium		Nuclear energy
Zeolite		Filter-aid, absorbents

Source: Adapted from U.S. Bureau of Mines, Mineral Commodity Summaries, 1987, 193 p.

RESOURCE/RESERVE CLASSIFICATION

	IDENTIFIED RE		ESOURCES	UNDISCOVERED RESOURCES	
	Demor	strated	Inferred	d Probability Range	
	Measured	Indicated	inierred	Hypothetical	Speculative
ECONOMIC	Rese	erves	Inferred Reserves		
MARGINALLY ECONOMIC	Marş Rese		Inferred Marginal Reserves		15°
SUB- ECONOMIC	Demor Subeco Reso	onomic	Inferred Subeconomic Resources		-

Major elements of mineral resource classification, excluding reserve base and inferred reserve base. Modified from McKelvey, V.E., 1972, Mineral resource estimates and public policy: American Scientist, v. 60, p. 32-40; and U.S. Bureau of Mines and U.S. Geological Survey, 1980, Principles of a resource/reserve classification for minerals: U.S. Geological Survey Circular 831, p. 5.

Figure 2.--Resource/reserve classification.

DEFINITION OF LEVELS OF MINERAL RESOURCE POTENTIAL AND CERTAINTY OF ASSESSMENT

LEVELS OF RESOURCE POTENTIAL

- HIGH mineral resource potential is assigned to areas where geologic, geochemical, and geophysical characteristics indicate a geologic environment favorable for resource occurrence, where interpretations of data indicate a high degree of likelihood for resource accumulation, where data support mineral-deposit models indicating presence of resources, and where evidence indicates that mineral concentration has taken place. Assignment of high resource potential to an area requires some positive knowledge that mineral-forming processes have been active in at least part of the area.
- M MODERATE mineral resource potential is assigned to areas where geologic, geochemical, and geophysical characteristics indicate a geologic environment favorable for resource occurrence, where interpretations of data indicate reasonable likelihood for resource accumulation, and (or) where an application of mineral-deposit models indicates favorable ground for the specified type(s) of deposits.
- LOW mineral resource potential is assigned to areas where geologic, geochemical, and geophysical characteristics define a geologic environment in which the existence of resources is permissive. This broad category embraces areas with dispersed but insignificantly mineralized rock, as well as areas with little or no indication of having been mineralized.
- N NO mineral resource potential is a category reserved for a specific type of resource in a well-defined area.
- U UNKNOWN mineral resource potential is assigned to areas where information is inadequate to assign a low, moderate, or high level of resource potential.

LEVELS OF CERTAINTY

- A Available information is not adequate for determination of the level of mineral resource potential.
- B Available information only suggests the level of mineral resource potential.
- C Available information gives a good indication of the level of mineral resource potential.
- D Available information clearly defines the level of mineral resource potential.

Α	В	С	D
U/A	H/B	H/C	H/D
	HIGH POTENTIAL	HICH POTENTIAL	HICH POTENTIAL
	M/B	M/C	M/D
	MODERATE POTENTIAL	MODERATE POTENTIAL	MODERATE POTENTIAL
UNKNOWN POTENTIAL	L/B	L/C	L/D
	LOW POTENTIAL	LOW POTENTIAL	LOW POTENTIAL
			N/D NO POTENTIAL

Abstracted with minor modifications from

Taylor, R.B., and Steven, T.A., 1983, Definition of mineral resource potential. Feonomic Geology, v. 78, no. 6, p. 1268-1270.

Taylor, R.B., Stoneman, R.J., and Marsh, S.P., 1984, An assessment of the mineral resource potential of the San Isabel National Forest, south-central Colorado: U.S. Geological Survey Bulletin 1638, p. 40-42

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LEVEL OF CERTAINTY -

Figure 3.--Definition of levels of mineral resource potential and certainty of classification.

Wilderness Study Areas (in alphabetical order)

Name:

Area number:

Alder Creek NV-020-600D

Size (acres):

5,142

Status of

mineral surveys:

This area was not studied by the U.S. Geological Survey or the U.S.

Bureau of Mines.

Identified mineral resources (known):

No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential (undiscovered): The study area has low potential for undiscovered mineral resources of gold and silver in epithermal veins with associated antimony, copper, lead, mercury, molybdenum, zinc, and uranium. The eastern part of the study area has low potential for undiscovered mineral resources of

tungsten in skarn deposits.

Mining activity: The Warm Springs mining district is about seven miles north of the wilderness study area and has produced 22,870 troy ounces of gold. The Varyville mining district, about six miles south of the wilderness study area, has produced 1,704 troy ounces of gold. The Leonard Creek mining district is about three miles southeast of the study area and is credited with 1,176 troy ounces of gold production, mostly placer, by the U.S. Bureau of Mines. The Pine Forest (Boyd Basin) mining district abuts the north boundary of the WSA; U.S. Bureau of Mines records show production of 1,305 troy ounces of gold and 418 troy ounces of silver here.

July 1989 BLM records show 49 lode and 2 placer claims active in or adjacent to the WSA.

Mineral setting:

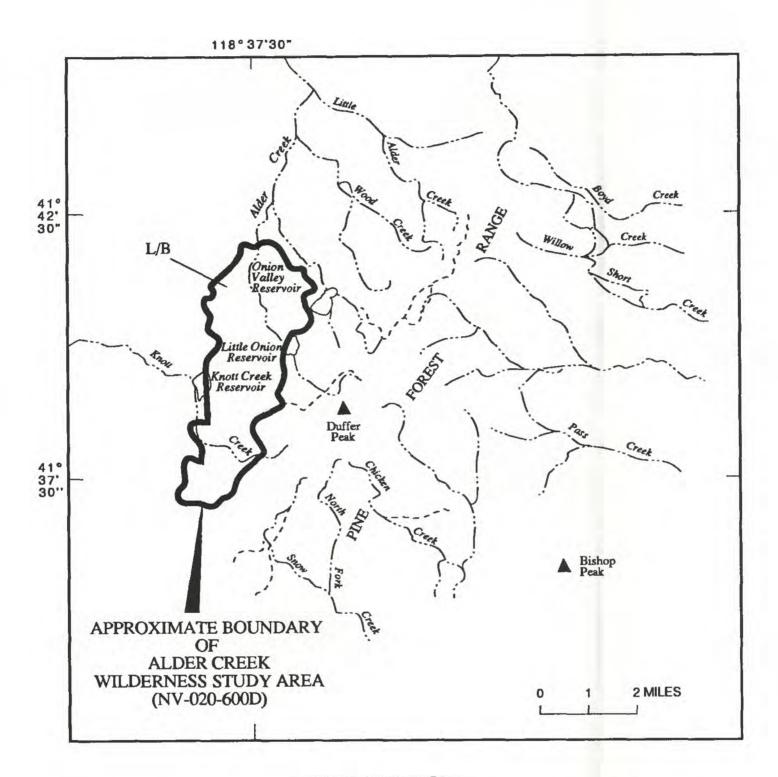
The study area is underlain by late Paleozoic and early Mesozoic sedimentary rocks that were metamorphosed, folded, and faulted prior to emplacement of Mesozoic granitic plutons. In parts of the study area, Tertiary lavas and tuffs unconformably overly the granitic and metamorphic rocks.

Recommendations: Additional sampling is needed to more clearly define mineralized and anomalous zones and trends. The wilderness study area should be studied as part of a comprehensive mineral survey by the Bureau of Mines and Geological Survey.

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EXPLANATION

L/B Geologic terrane having low mineral resource potential for gold, silver, antimony, copper, lead, mercury, molybdenum, zinc, uranium, tungsten with certainty level B

Mineral resources of the Alder Creek Wilderness Study Area.

Name:

Antelope

Area number:

NV-060-231/241

Size (acres):

87,400 of which 83,100 were studied at the request of the U.S. Bureau of

Land Management.

Status of

mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of

Mines (Hardyman and others, 1987).

Identified mineral resources (known):

No mineral resources have been identified in the Wilderness Study Area. However, three areas contain anomalous gold values (Limestone Spring, Red Spring, and Big Cow Canyon).

Mineral resource potential (undiscovered):

The southern part of the area has moderate mineral resource potential for undiscovered gold and silver, and the Woodruff Formation in the southern part of the area has high resource potential for undiscovered vanadium, zinc, selenium, molybdenum and silver (fig.1). The remainder of the study area has low resource potential for undiscovered gold, silver, lead, zinc, manganese, tin, and molybdenum. The study area also has low resource potential for undiscovered oil and gas resources.

Mining Activity:

The Morey mining district, located about 5 mi southeast of the WSA produced less than \$1 million in silver, gold and lead. Unrecorded amounts of gold, silver, and barite have been produced from the Segura Ranch Area district north of the WSA. No production from within the WSA is known.

The Fandango gold deposit is on a claim block which extends into the southern part of the WSA. Exploration on this deposit by Long Lac Mineral Exploration, Inc. and other nearby areas by Amselco Exploration, Inc., Canyon Resources, and Blue Sky Oil and Gas are reported within the past 3 years.

July 1989 BLM records show 10 lode claims active in the WSA. Also, there were 3 oil and gas leases active in 1987 encompassing 8,200 acres.

Mineral setting:

Most of the study area consists of rugged mountainous terrain having approximately 2,600 ft of relief. The mountain range is a block tilted gently to the east and bounded on both sides by normal faults that dip steeply to moderately west and have major displacements. Most of the study area is underlain by a thick sequence of Tertiary volcanic rocks that predominantly consist of silicic ash-flow tuff, the Windous Butte Formation. Paleozoic and lower Mesozoic (see geologic time chart) marine sediments occur along the southern margin of the study area, and lower Paleozoic rocks are exposed in the northeast corner.

Recommendations: As only part of this area has been studied as part of a mineral survey by

the U.S. Geological Survey and the U.S. Bureau of Mines, further work

is needed to assess the 4,300 acres that constitute the balance.

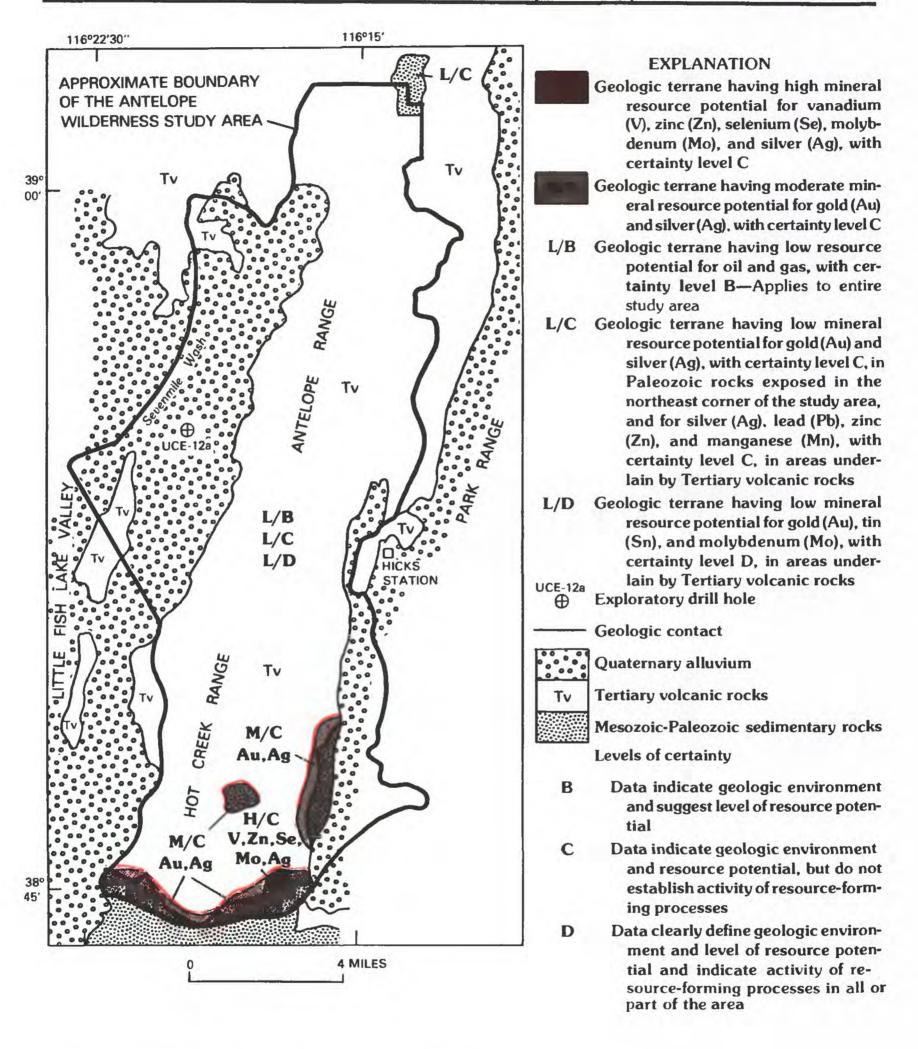
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Mineral resources of the Antelope Wilderness Study Area.

Name:

Arrow Canyon Range

Area number:

NV-050-215

Size (acres):

32,853

Status of

This area was not studied by the U.S. Geological Survey or the U.S. mineral surveys:

Bureau of Mines.

Identified mineral resources (known):

No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential (undiscovered): Oil and gas leases were held on parts of the study area in 1988 by a major oil company and several smaller companies (Nevada Mining Association, 1988). Sandberg (1983) shows the vicinity of the study area as having moderate potential for oil and gas. Silica sand has been quarried near the boundary of the study area, and there is moderate potential for additional non-metallic resources in the study area, including: silica sand, clay (montmorillonite), gypsum, diatomite, carbonate rock, and sand and gravel. There is no evidence of metallic mineralization in the area.

Mining activity: In the 1930's, more than 500,000 tons of high-calcium limestone were being produced annually from the Crystal Pass Member of the Sultan Limestone (Longwell and others, 1965, p. 205) near the study area. High-calcium limestone and lime are currently being produced at Apex, about fifteen miles south of the study area. Plans for expansion to the north (Dr. Star Curtis, telephone conversation, 1989) would bring the limestone mining near the south boundary of the study area.

Small amounts of bentonite have been mined for pharmaceuticals and diatomaceous beds have been mined for building stone in the Muddy Creek Formation in the vicinity of the north part of the study area (Longwell and others, 1965). Eureka Quartzite, mined along the west side of the study area, is crushed and sold as decorative stone(?) (Great Basin GEM Joint Venture).

Sand and gravel material sites have been designated in the vicinity by the U.S. Bureau of Land Management (Great Basin GEM Joint Venture, 1983), one adjacent to the north tip of the study area; four sand and gravel pits along Highway 93, west of the study area, are shown on topographic maps.

Numerous mining claims in and adjacent to the WSA, including the Tiffany claim (patented) have been staked, many for industrial minerals. July 1989 BLM records show seven lode mining claim locations active in the WSA.

The whole study area was covered by federal oil and gas leases in 1983 (Great Basin GEM Joint Venture, 1983). Small, uneconomic amounts of oil and gas have been found in the region (Longwell and others, 1965. p. 206, 207). Warm and hot springs occur about two miles east of the study area.

Mineral setting:

The geology of the area consists of a section of Cambrian through Permian sedimentary strata--a nearly complete section of Paleozoic rocks. The most abundant rock types in the area are limestones and dolimites Other stratified sedimentary rocks consist of quartzite, sandstone, siltstone, and shale. Overlying the Paleozoic rocks is a Tertiary sequence of tuffaceous sedimentary rocks and tuff. The area has been broken by both normal and low-angle thrust faults.

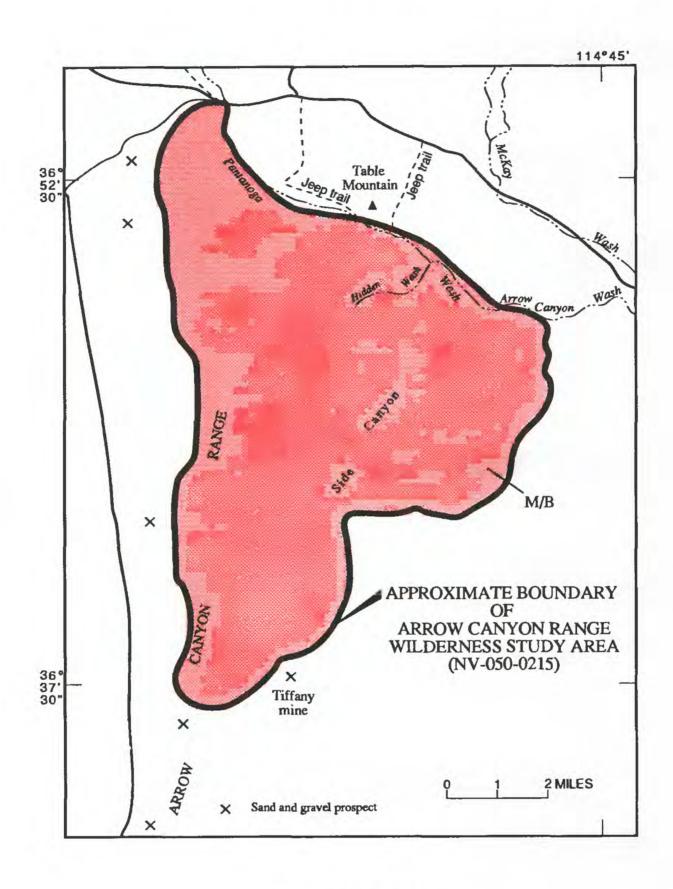
Recommendations:

The wilderness study area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and U.S. Geological Survey.

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EXPLANATION

M/B Geologic terrane having moderate mineral resource potential for oil and gas, silica sand, clay, gypsum, diatomite, limestone, and sand and gravel with certainty level B

Mineral resources of the Arrow Canyon Range Wilderness Study Area.

Area number:

Size (acres):



Status of

mineral surveys:

This area was not studied by the U.S. Bureau of Mines or the U.S.

Geological Survey.

Identified mineral resources (known):

No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential (undiscovered):

The Augusta Mountains area has a moderate potential for mercury in Triassic rocks and for manganese deposits in Paleozoic chert-argillite sequences and in Tertiary rocks. It has a moderate potential for gold and low potential for silver and other precious and base metal deposits in carbonate rocks, for massive sulfides deposits in Paleozoic chert-argillite sequences, and for nickel, copper, and platinum group elements in a Jurassic grabbro. The area has a moderate potential for geothermal energy near hot-water springs along major basin-and-range faults in the western part of the area, and a low potential for oil and gas in Tertiary sedimentary and volcanic rocks and in pre-Tertiary carbonate rocks.

Mining activity:

The Wildhorse mine, one mile south of the southeastern corner of the WSA produced 883 flasks of mercury in 1940 (Bailey and Phoenix, 1944, p. 111). The McCoy mine is two miles east of the Wildhorse mine and two miles southeast of the WSA. It produced 78 flasks of mercury in the years 1919-1920, and another 31 flasks in 1932-1934 (Bailey and Phoenix, 1944). In operations between 1954 and 1960, another 100 flasks of mercury was produced (U.S.Bureau of Mines, 1965). Both mines are in the Wildhorse mining district.

Drilling is planned in the east-central portion of the WSA to evaluate areas of suspected gold mineralization.

There are about 280 claims in the WSA, including large blocks of claims held by Minerals Exploration Company and FMC Minerals Corporation in the eastern and northeastern portions of the area (BLM records, July 1989). Geothermal leases cover 18,101 acres of the WSA, and 44,266 acres are covered by oil and gas leases.

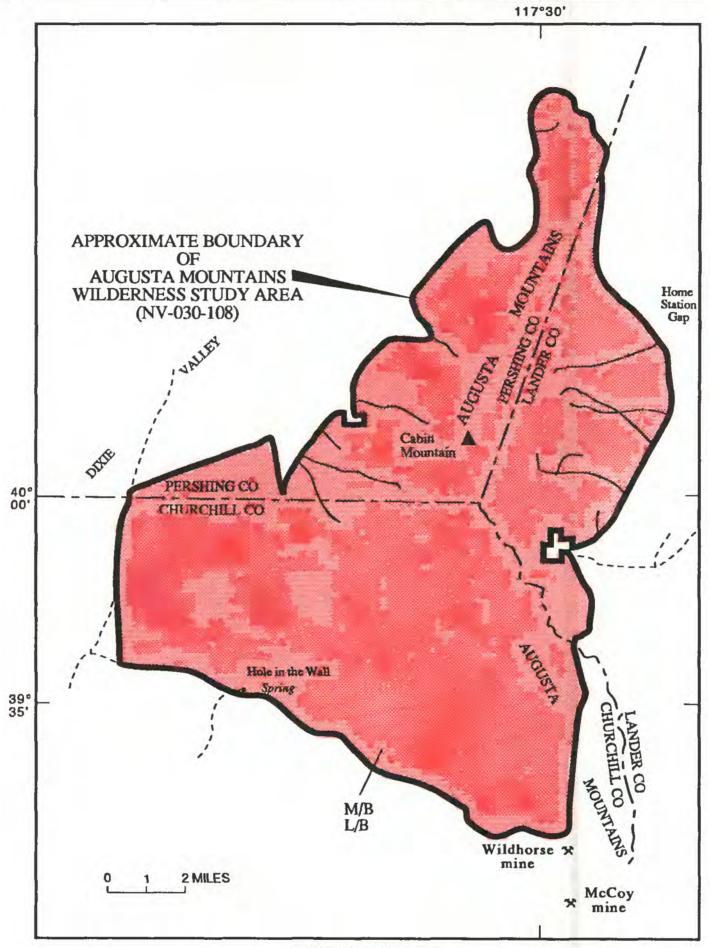
Mineral setting:

The Augusta Mountains area consists of a major mountain range composed largely of shallow Triassic carbonate and clastic rocks, overlying a deep-water Paleozoic chert-argillite sequence. A Jurassic gabbro crops out in the southernmost part of the area. A Tertiary cover of tuff and sedimentary rocks is widespread in the northern, eastern, and southern parts of the area.

Recommendations: The Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey. The southeastern portions of the WSA should be examined for the presence of mercury and precious metal resources. The favorability for zeolite reported by Higgins and others (1987) should be evaluated.

References:

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- Higgins, L.R., Earnest, D.F., and Cox, A.D., 1988, Nevada BLM Wilderness Study Areas mineral potential handbook: Nevada Mining Association, Reno, Nevada, 257 p.
- Johnson, M.G., 1977, Geology and mineral deposits of Pershing County, Nevada: Nevada Bureau of Mines and Geology Bulletin 89, 115 p.
- Lawrence, E.F., 1963, Antimony deposits of Nevada: Nevada Bureau of Mines and Geology Bulletin 61, 248 p.
- Stewart, J.H., and McKee, E.H., 1977, Geology and mineral deposits of Lander County, Nevada with a section on mineral deposits by H. K. Stager: Nevada Bureau of Mines and Geology Bulletin, 88, 106
- U.S. Bureau of Mines, 1965, Mercury potential of the United States: U.S. Bureau of Mines Information Circular 8252, 376 p.
- Wilden, Ronald, and Speed, R.C., 1974, Geology and mineral deposits of Churchill County, Nevada: Nevada Bureau of Mines and Geology Bulletin, 83, 95 p.



EXPLANATION

M/B Geologic terrane having moderate mineral resource potential for gold, mercury, manganese, and geothermal energy with certainty level B

L/B Geologic terrane having low mineral resource potential for oil and gas with certainty level B

Mineral resources of the Augusta Mountains Wilderness Study Area.

Bad Lands NV-010-184

Area number: Size (acres):

9,426 of which 8,415 were studied at

the request of the U.S. Bureau of

Land Management.

Status of

mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of

Mines (Johnson and others, 1987).

Identified mineral resources (known):

No mineral resources have been identified in the wilderness study area.

Mineral resource potential

potential (undiscovered):

The study area has low mineal resource potential for undiscovered deposits of all metallic minerals, oil, gas, and coal, and for geothermal energy. Factors contributing to this conclusion include low metal content of all geochemical samples, lack of known structures or traps for petroleoum resources, and lack of evidence of geothermal activity within the study area.

the study area.

Mining activity:

The nearest mining activity occurred about 2 to 5 miles east of the WSA in the Contact mining district. As of November 1983, no mining claims had been staked in the area.

Mineral setting:

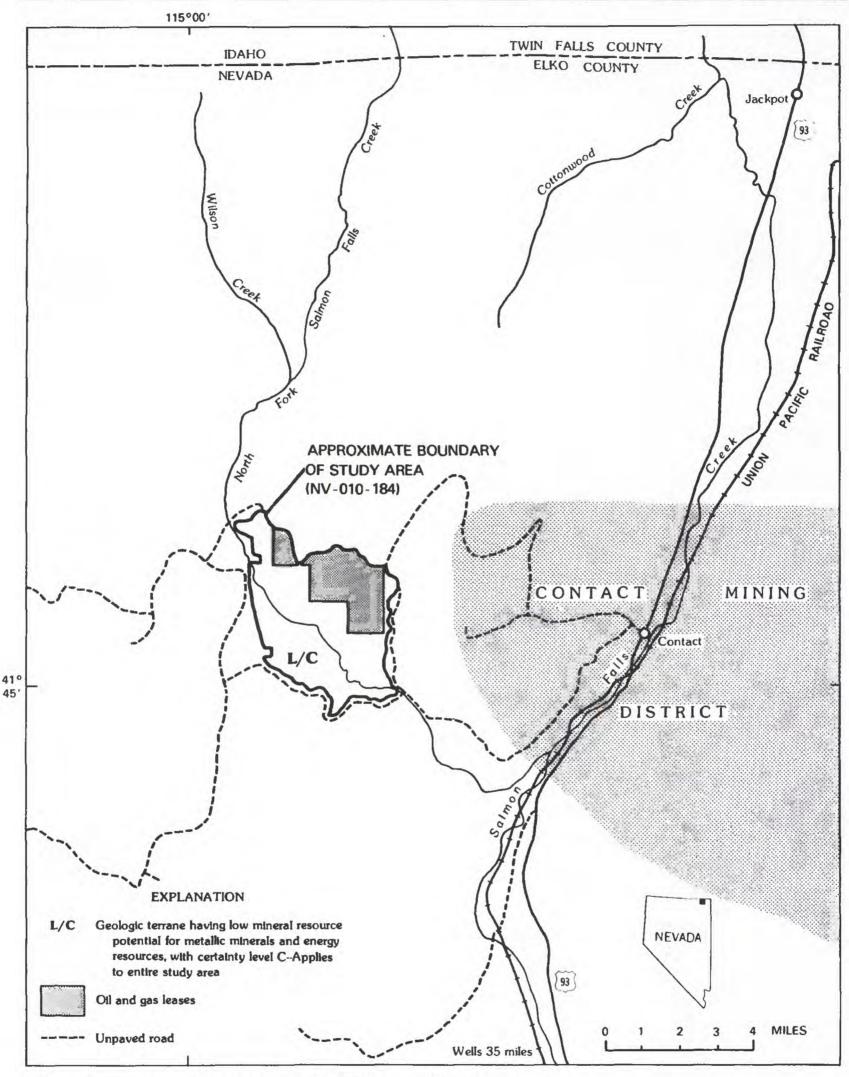
Upper Paleozoic (see geologic time chart in appendix) sedimentary rocks, the oldest rocks in the area, are exposed on the western slope of L & D Mountain, immediately east of the study area boundary. These rocks consist of a lower unit of thinly laminated detrital limestone and an upper unit of thinly bedded siliceous rocks including siltstone, mudstone, and argillite. The next oldest rock exposed in the vicinity, and the rock that underlies most of the study area, is the Tertiary Jarbidge Rhyolite, a thick sequence of reddish-gray, felsic volcanic extrusive rocks. The Jarbidge Rhyolite is overlain by easily weathered Tertiary sedimentary and pyroclastic rocks. Capping the steep slopes of the sedimentary and pyroclastic rocks is the Tertiary Cougar Point Welded Tuff. A Tertiary basalt flow and lapilli tuff unit overlies the Cougar Point Welded Tuff at the top of Big Devils Table south of the study area. Quaternary alluvial and colluvial deposits of at least two ages cover many of the steep slopes around the periphery of the study area.

Recommendations:

As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 1,011 acres that constitute the balance.

References:

- Johnson, B.R., Richter, D.H., Grauch, V.J.S., and Kreidler, T.J., 1987, Mineral resources of the Bad Lands Wilderness Study Area, Elko County, Nevada: U.S. Geological Survey Bulletin 1725-A, 7 p.
- Kreidler, T.J., 1984, Mineral investigation of the Badlands Wilderness Study Area, Elko County Nevada: U.S. Bureau of Mines Open-File Report MLA 18-84, 6 p.



Mineral resources of the Bad Lands Wilderness Study Area.

Area number:

Black Rock Desert

NV-020-620 Size (acres):

319,594 of which 174,300 were studied at the request of the U.S. Bureau of Land Management.

Status of

mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of

Mines (Calzia and others, 1987).

Identified mineral resources (known):

No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential (undiscovered): Geologic, geochemical, geophysical, and mineral surveys indicate that the study area has moderate potential for gold, silver, mercury, lithium, and geothermal resources and low potential for oil and gas resources

although no mines or prospects were identified within this area.

Mining activity: There is no known mineral activity within the WSA. The Sulphur mining district is located near the southeastern portion of the WSA. It has produced silver, sulphur and mercury, and it is currently producing gold. The current operation is a heap leach operation operated by Standard Slag Company. Other industry exploration efforts in the area have reported significant gold mineralization.

July 1989 BLM records show about 50 mining claims in the WSA, mostly in the northwestern portion. Six oil and gas leases cover 19,560 acres of the WSA, and six geothermal leases cover 12,026 acres. The Pinto Hot Springs KGRA is located on the northwestern border of the area. The Double Hot Springs KGRA is 7 miles southwest of the study area.

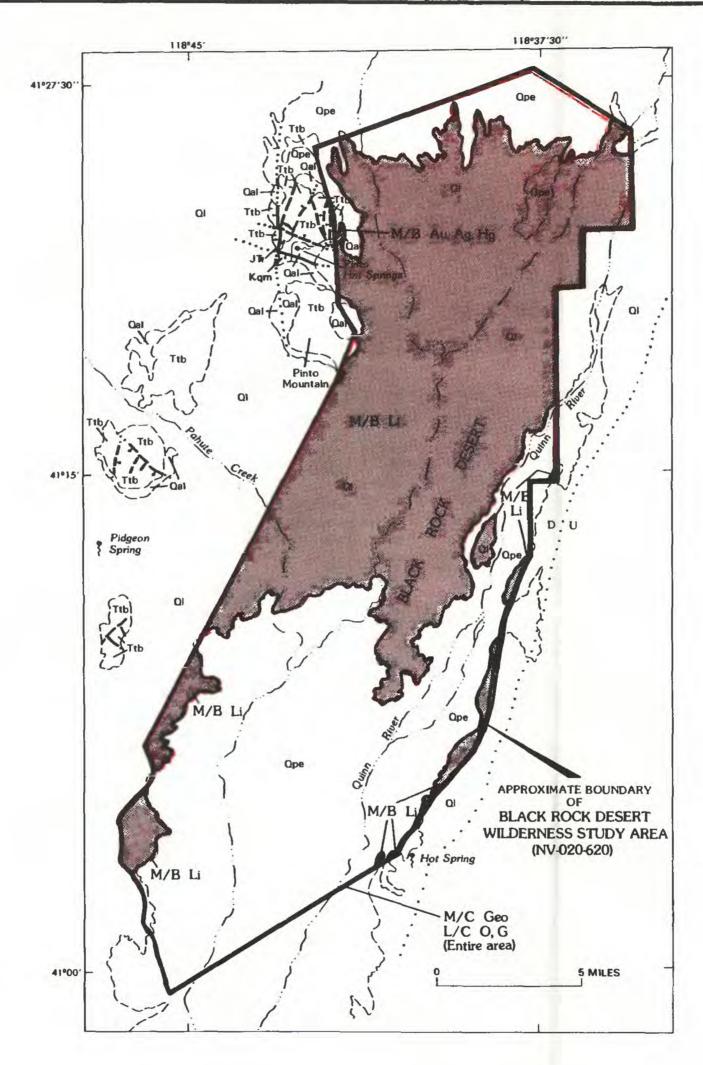
Mineral setting:

The Black Rock Desert is in the Basin and Range physiogrpahic province. This province is characterized by northwest-trending faultbounded mountains separated by wide parallel valleys. The Black Rock Desert is within a down-dropped fault block that is filled by Cenozoic sediments. Hills and mesas northwest of the study area are underlain by Triasic-Jurrassic (see geologic time chart) phyllite, quartzite, and limestone, Cretaceous quartz monzonite, and Miocene-Pliocene tuffs, rhyolite flows, and basalt.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 145,294 acres that constitute the balance.

References:

- Calzia, J.P., Lawson, W.A., Dohrenwend, J.C., Plouff, Donald, Turner, Robert, and Olson, J.E., 1987, Mineral Resources of the Black Rock Desert Wilderness Study Area, Humboldt County, Nevada: U.S. Geological Survey Bulletin 1726-E, 13 p.
- Higgins, L.R., Earnest, D.F., and Cox, A.D., 1988, Nevada BLM Wilderness Study Areas mineral potential handbook: Nevada Mining Association, Reno, Nevada, 257 p.
- Olson, J.E., 1985, Mineral resources of the Black Rock Desert Wilderness Study Area, Humboldt County, Nevada: U.S. Bureau of Mines Open File Report MLA 65-85, 19 p.
- Vanderburg, W.O., 1938, Reconnaissance of mining districts in Humboldt County, Nev.: U.S. Bureau of Mines Information Circular 6995, 54 p.
- Willden, Ronald, 1964, General geology and mineral deposits of Humboldt County, Nevada: Nevada Bureau of Mines Bulletin 59, 154 p.



Mineral resources of the Black Rock Desert Wilderness Study Area.

EXPLANATION

Area with moderate mineral resource potential--Entire study area has moderate potential for geothermal resources

Area with low mineral resource potential--Entire study area has low potential for oil and gas resources

See appendix for definition of levels of resource potential and certainty of assessment

Commodities

Au Gold
Ag Silver
Hg Mercury
Li Lithium
Geo Geothermal
O,G Oil and gas

Geologic map units

Qal	Alluvium including hot-spring deposits (Holocene and Pleistocene)
Ope	Playa and aeolian sand deposits (Holocene)
Qi	Lacustrine deposits of Lake Lahontan (Pleistocene)
Ttb	Tuffs and basaits (Oligocene and Miocene)
Kqm	Quartz monzonite (Cretaceous)
JE	Quartzite, phyllite, and limestone (Jurassic or Triassic)

Contact--Dashed where approximately located
Normal fault--Dashed where approximately located;
dotted where concealed; ball and bar on downthrown side; D on downthrown side; U on upthrown side

Blue Eagle

Area number:

NV-060-158/199

Size (acres):

59,560 of which 51,350 were studied at the request of the U.S. Bureau of

Land Management.

Status of

mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Lund and others, 1987).

Identified mineral resources (known):

There are no identified mineral resources in the Blue Eagle Wilderness Study Area. A possible low-grade, gold-bearing jasperoid-shale sequence is present in the north-central part of the study area. Gold and silver occur in fault zones and associated quartz veins just outside the southwestern part of the study area. Outcrops of vitric tuff (which have been mined as a decorative building stone) occur in the northern part of the study area.

Mineral resource potential (undiscovered):

The entire Blue Eagle Wilderness Study Area has high energy resource potential for petroleum, although appropriate traps have not been identified. Most of the area is covered by oil and gas leases.

Moderate mineral resource potential is recongized for three types of metal occurrence in five areas. The southwestern corner of the area has moderate potential for tungsten and polymetallic base-metal (bismuth, molybdenum, copper, lead, and zinc) deposits in hydrothermal (low-to medium-temperature) replacement deposits in low-grade metamoprhic rocks and for gold and silver in quartz veins associated with the replacement imineralization. The north and central parts of the area have moderate potential for gold in disseminated deposits associated with jasperoid occurrences. Two areas on the southeastern and western sides of the wilderness study area have moderate potential for zinc and antimony deposits possibly associated with hydrothermal fluids that moved along highly brecciated fault zones.

The study area has low resource potential for all other metals, nonmetals, geothermal energy, and coal.

Mining activity:

No organized mining districts and no mines, prospects, or patented claims are situated in the wilderness study area. An unpatented group of claims in the north-central part of the area is located on jasperoid outcrops associated with shale. In 1981, 12 holes were drilled into the jasperoid-shale sequence in a joint venture between Energy Reserves Group of Golden, Colorado, and U.S. Minerals Exploration Co., of Arvada, Colorado. No significant gold anomalies were found and the claims were allowed to lapse. The claims were restaked in 1984, and a new block of claims was staked contiguous to and west of the old group by J. W. Mueller, Arvada, Colorado.

Outside the southwestern corner of the wilderness study area, faults and associated quartz veins containing gold and silver are exposed by 16 prospect pits, 1 shaft, and 3 adits. These workings are operated intermittently, and are covered by a group of unpatented claims. North of the wilderness study area, vitric tuff has been mined for decorative building stone at the El Padre mine. It is operated intermittently.

Mineral setting:

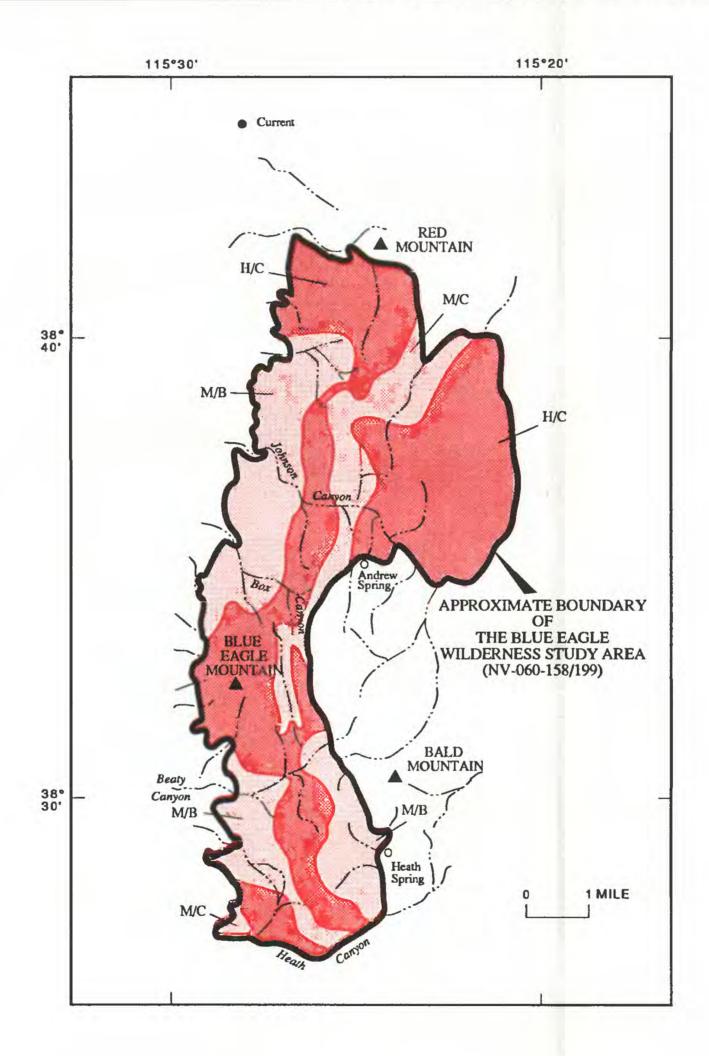
The Grant Range is an east-tilted fault block. The faulting exposed a stratigraphic section, section, from west to east, of thick carbonate sedimentary rocks of the Paleozoic (see geologic time scale) continental shelf that are overlain by Tertiary basin deposits and by a sequence of Tertiary volcanic and basin-fill deposits. The oldest exposed rocks, which are on the western side of the range, are metamorphosed lower Paleozoic rocks. In detail, the range is structurally complex; the area has been affected by both Mesozoic compressional and Tertiary extensional processes.

Recommendations:

As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 8,210 acres that constitute the balance. More detailed mapping, and surface and subsurface sampling are needed to determine the extent and grade of gold and silver occurrences adjacent to the southwest corner of the wilderness study area.

References:

Lund, K.L., Nash, J.T., Beard, L.S., Blank, H.R., Jr., and Tuftin, S.E., 1987, Mineral resources of the Blue Eagle Wilderness Study Area, Nye County, Nevada: U.S. Geological Survey Bulletin 1731-D, 19 pages.

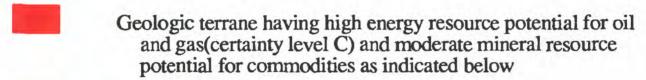


Mineral resources of the Blue Eagle Wilderness Study Area.

EXPLANATION

[The wilderness study area has low resource potential for metals not shown below, nonmetals, and geothermal energy, with certainty level B]

H/C	Geologic terrane having high energy resource potential for oil
	and gas, at certainty level C



M/B	Zinc a	nd a	antimony (certainty	level B)
		414	The state of the s	(COL CULLING)	-01011)

M/C	Gold	Containte	level (15
TATA	Oolu	(certainty	ICACI (-)

M/C Gold and silver; tungsten; bismuth, copper, molybdenum, lead, and zinc (certainty level C)

Levels of certainty

B—Available information suggests level of resource potential

C—Available information gives good indication of level of resource potential

Blue Lakes NV-020-600

Area number: Size (acres):

20,508 of which 16,400 were studied

at the request of the U.S. Bureau of

Land Management.

Status of

mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of

Mines (Bergquist and others, 1987).

Identified mineral resources (known):

No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential

(undiscovered):

There is a low potential for undiscovered gold and silver resources and associated antimony, copper, lead, mercury, molybdenum, zinc, and uranium throughout the study area. A low potential exists for undiscovered tungsten resources in skarn in 3 small areas of limestone in

the northern part of the study area.

Mining activity: The Warm Springs mining district is about seven miles north of the wilderness study area and has produced 22,870 troy ounces of gold. The Varyville mining district, about six miles south of the wilderness study area, has produced 1,704 troy ounces of gold. The Leonard Creek mining district is about three miles southeast of the study area and is credited with 1,176 troy ounces of gold production, mostly placer, by the U.S. Bureau of Mines. The Pine Forest (Boyd Basin) mining district abuts the north boundary of the WSA; U.S. Bureau of Mines records show production of 1,305 troy ounces of gold and 418 troy ounces of silver here.

July 1989 BLM records show 49 lode and 2 placer claims active in or adjacent to the WSA.

Mineral setting:

The study area is underlain mostly by granitic rocks of Jurassic and Cretaceous age (see geologic time scale). The northeastern part of the study area is underlain by folded and faulted marine metasedimentary rocks of Permian(?) and Triassic age that are intruded by the younger

granitic rocks.

Recommendations: As only part of this area has been studied as part of a mineral survey by

the U.S. Geological Survey and the U.S. Bureau of Mines, further work

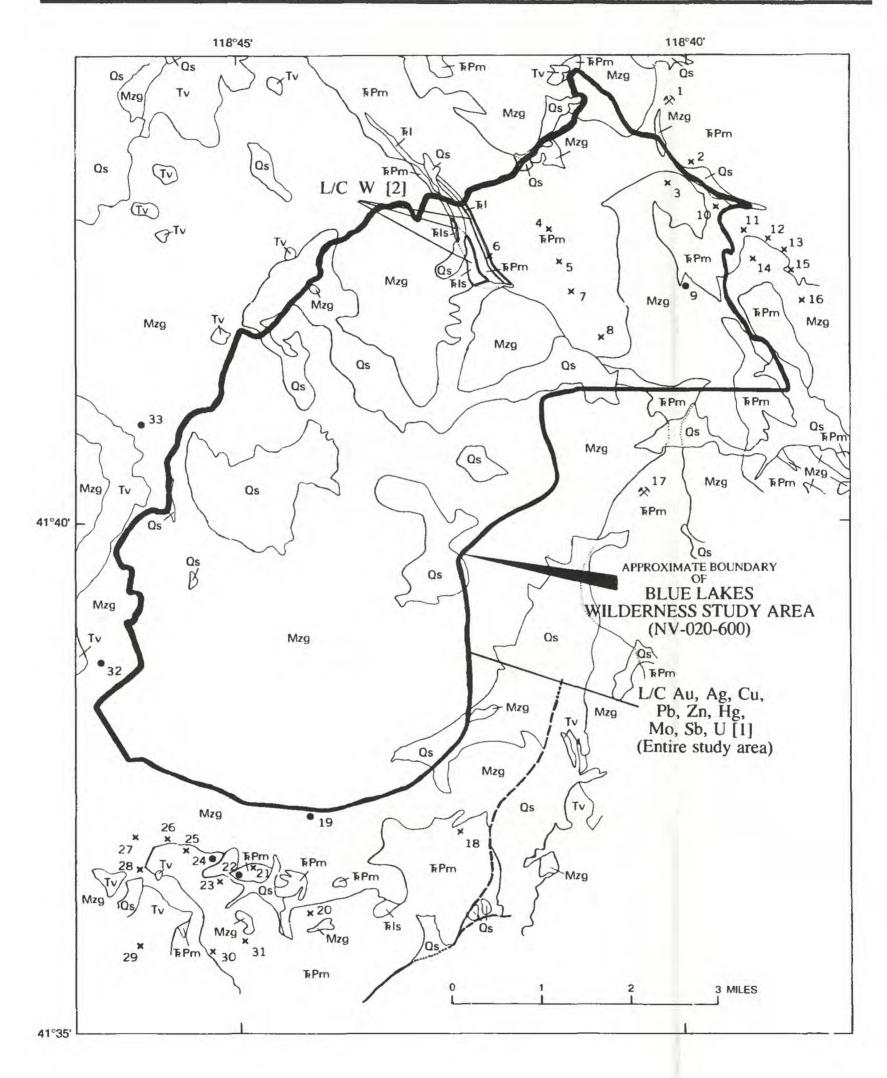
is needed to assess the 4,108 acres that constitute the balance.

References: Bennett, R.E., 1973, Mineral resources of the Blue Lakes proposed

primitive area, Humboldt County, Nevada: U.S.Bureau of Land

Management Open-File Mineral Report, 29 p.

- Bergquist, J.R., Plouff, Donald, Turrin, B.D., Smith, J.G., Turner, R.L., and Willett, S.L., 1987, Mineral resources of the Blue Lakes Wilderness Study Area, Humboldt County, Nevada: U.S. Geological Survey Bulletin 1726-D, 18 p.
- Conners, R.A., Robinson, M.L., Bukofski, J.F., Meyer, W.T., and Howarth, R.J., 1982, Geochemical and geostatistical evaluation of wilderness study areas, Winnemucca District, northwestern Nevada: Golden, Colorado, Barringer Resources, Incorporated for U.S. Bureau of Land Management contract Open-File Report, v. 1-5, 2 plates.
- Hill, J.M., 1912, The mining districts of the western United States: U.S. Geological Survey Bulletin 507, 309 p.
- Johnson, M.G., 1973, Placer gold deposits of Nevada: U.S. Geological Survey Bulletin 1356, 118 p.
- Lawrence, E. F., 1962, Antimony occurrences in Nevada: Nevada Bureau of Mines Map 2, scale 1:1,000,000.
- Smith, J.G., 1973, Geologic map of the Duffer Peak Quadrangle, Humboldt County, Nevada: U.S. Geological Survey Miscellaneous Geologic Investigations Map I-606, scale 1:48,000.
- Vanderburg, W.O., 1938, Reconnaissance of mining districts in Humboldt County, Nevada: U.S. Bureau of Mines Information Circular 6995, 54 p.
- Wilden, Ronald, 1964, Geology and mineral resources of Humboldt County, Nevada: Nevada Bureau of Mines and Geology Bulletin 59, 154 p.
- Willett, S.L., 1986, Mineral resources of the Blue Lakes and Alder Creek Wilderness Study Areas, Humboldt County, Nevada: U.S. Bureau of Mines Open-File Report MLA 33-86, 21 p.



Mineral resources of the Blue Lakes Wilderness Study Area.

	Area with low mi appendix for de potential and ce	finition of	source potential—See levels of mineral resource assessment		
	Commodities				
Ag	Silver	Pb	Lead		
Au	Gold	Sb	Antimony		
Cu	Copper	U	Uranium		
Hg	Mercury	W	Tungsten		
Мо	Molybdenum	Zn	Zinc		
[]	Types of deposits	5			
1	Hydrothermal veins in granitic and metamorphic rocks				
2	Skarn deposits in carbonate rocks near contact with granitic rocks				
	Descript	ion of	Map Units		
Qs	· 기업 : [1] [1] [1] [1] [1] [1] [1] [1] [1] [1]		ry)—Includes moraines,		
Tv	alluvium, and landslide deposits Volcanic rocks (Tertlary)—Consists of andesite flows, basalt flows, and tuff				
Mzg	Granitic rocks (Me Quartz Diorite (Ju	esozolc)- urassic), l	-Consists of Theodore Duffer Peak Granodiorite and plugs of alaskite and		
Tel	massive ilmesto massive white to grading upwa limestone, limy s carbonaceous	buff pur rd into sandstone limestor Part of t	assic)—Consists of re limestone at the base quartz-sand-bearing re, pebble conglomerate, ne, and fine-grained the sedimentary rocks of		
Tals	Limestone (Triassi quartz-sand-beal limestone-pebble	c)—Cons ring to pu conglor	re limestone, with a white nerate at the base. Part of Bishop Canyon (Smith,		
Ta Pm	Metasedimentary rocks (Triassic and Permian?)— Consists of quartzite and biotite-hornblende schist (unit Tk q of Smith, 1973), phyllite, sandy homfels, and chert-pebble conglomerate (unit Tk p of Smith, 1973), and chert, phyllite, and sandy homfels (unit Tk c, a part of the Sedimentary Rocks of Bishop Canyon of Smith, 1973)				
	Contact—Dotted w	here cond	cealed		
	Fault—Dashed who where concealed		ximately located; dotted		
1×	Mine—See table 1 f	or descri	ption		

9 Mineralized outcrop—See table 1 for description

Explanation, mineral resources of the Blue Lakes Wilderness Study Area.

Prospect

Bluebell

Area number:

NV-010-027

Size (acres):

55,665 of which 41,324 were studied at the request of the U.S. Bureau of

Land Management.

Status of

mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of

Mines (Ketner and others, 1987).

Identified mineral resources (known):

A Carlin-type disseminated gold occurrence is present in the southern part of the WSA between Morgan Pass and Erickson Canyon. High-calcium

limestone is present throughout most of the WSA.

Mineral resource potential

(undiscovered):

Parts of the Bluebell Wilderness Study Area have high and moderate potential for gold resources, and there is low resource potential for tin, tungsten, beryllium, uranium, and thorium throughout the study area. There is high resource potential for high-purity limestone, and moderate resource potential for high-purity phosphate. The area has low resource

potential for oil and gas.

Mining activity:

Battle Mountain Exploration Co. drilled the disseminated gold occurrence during the summers of 1985-1988, and in the summer of 1989 they did geophysical work. Numerous unpatented mining claims on file with the

BLM.

Mineral setting:

Rock formations of the Bluebell Wilderness Study Area are mainly limestone and dolomite ranging in age from Cambrian to Permian (245 to 540 million years old). Less extensive areas are underlain by younger igneous rocks and unconsolodated alluvium. Principal structures include low angle planar faults that locally cut out portions of the stratigraphic column, listric, or curved, faults that merge from high angles to low angle, and near-vertical planar faults. Some of the high-angle faults are

mineralized with gold.

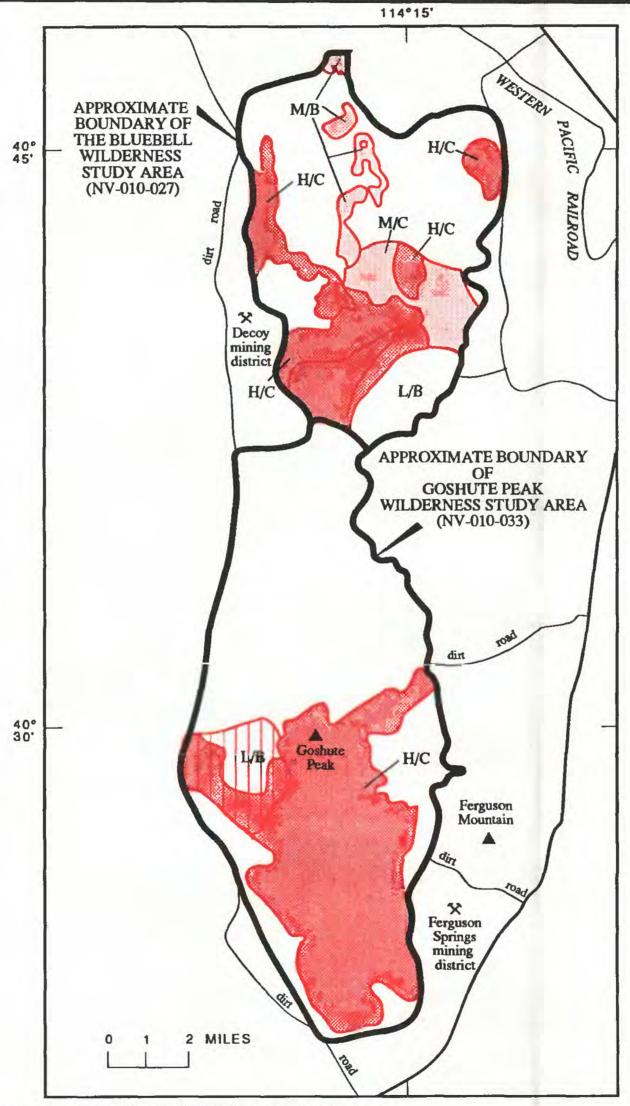
Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 14,341 acres that constitute the balance.

References:

Brown, S.D., 1985, Mineral resources of part of the Bluebell (NV-010-027) and Goshute Peak (NV-010-033) Wilderness Study Areas, Elko County, Nevada: U.S. Bureau of Mines Open-File Report MLA 66-85, 22 p.

Day, W.C., Elrick, Maya, Ketner, K.B., and Vaag, M.K., 1987, Geologic map of the Bluebell and Goshute Peak Wilderness Study Areas, Elko County, Nevada: U.S. Geological Survey Miscellaneous Field Studies Map MF-1932.

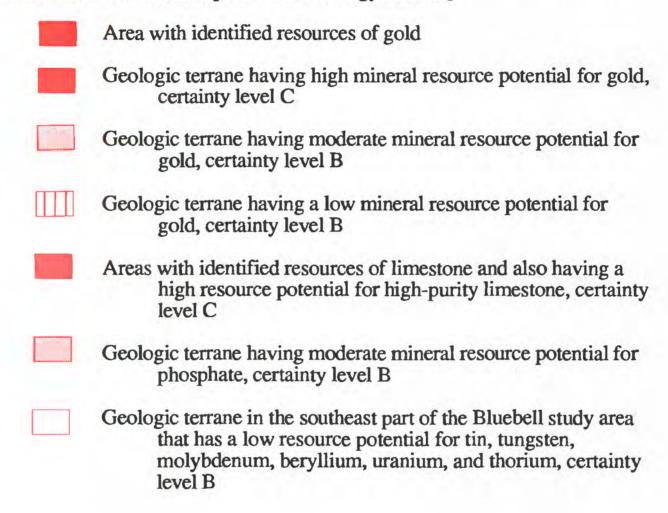
- Granger, A.E., Bell, M.M., Simmons, G.C., Lee, Florence, 1957, Geology and mineral resources of Elko County, Nevada: Nevada Bureau of Mines Bulletin 54, 190 p.
- Hill, J.M., 1916, Notes on some mining districts in eastern Nevada: U.S. Geological Survey Bulletin 648, p. 97-98.
- Ketner, K.B., Day, W.C., Elrick, M., Vaag, M.K., Gerlitz, C.N., Barton, H.N., Saltus, R.S., and Brown, S.D., 1987, Mineral resources of the Bluebell and Goshute Peak Wilderness Study Areas, Elko County, Nevada: U.S. Geological Survey Bulletin 1725-C, 18 p.



Mineral resources of the Bluebell Wilderness Study Area.

EXPLANATION

[Identified resources of common sand and gravel are present in small areas throughout both the Bluebell and Goshute Peak study areas. Both study areas have low resource potential for energy sources]



Explanation, mineral resources of the Bluebell Wilderness Study Area.

Area number:

Bonelli Peak NV-050-238

Size (acres):

6,500

Status of

mineral surveys:

This area was not studied by the U.S. Bureau of Mines or the U.S.

Geological Survey.

Identified mineral resources (known):

No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential

(undiscovered):

The Bonelli Peak wilderness study area has moderate potential for gold, silver, copper, lead, zinc, beryllium, feldspar, and mica. There is no

potential for oil and gas.

Mining activity:

Jemex Resources, Inc. had claims in the area recently and Leavitt Boyd presently (July 1989) has 14 claims on the Lakeside mine, which is inside of the WSA. These claims or associated ones have been held since at least 1942.

Mineral setting:

The Bonelli Peak wilderness study area is underlain entirely by Precambrian metamorphic rocks consisting of gneiss and schist with lesser amounts of gneissic granite, pyroxenite, migmatite, pegmatite, and marble.

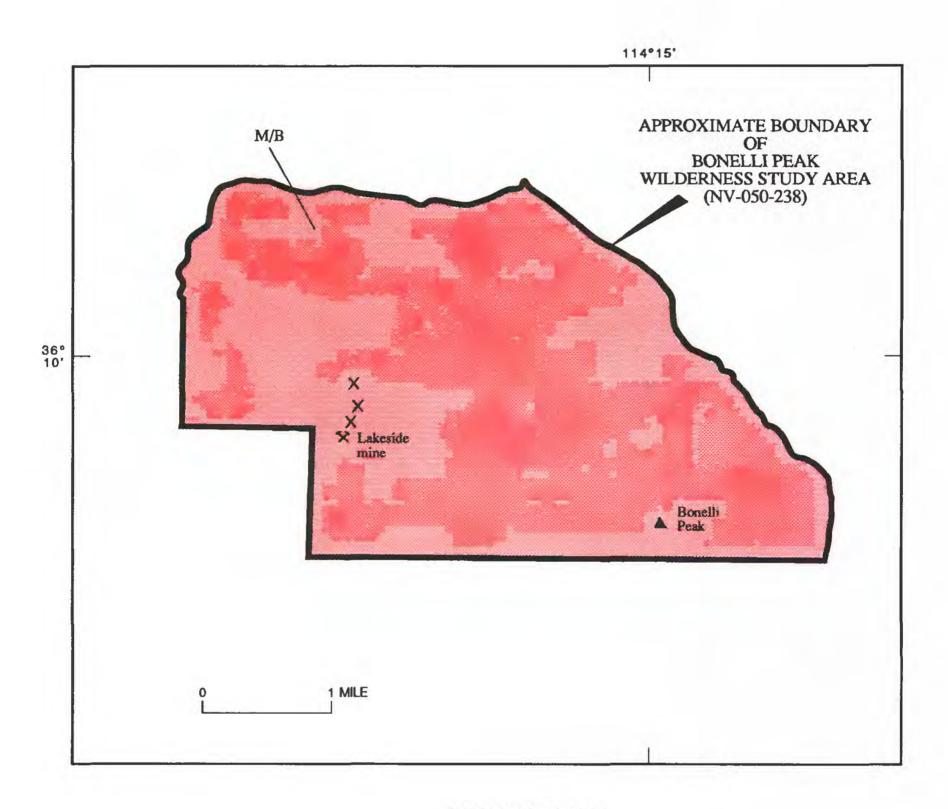
Recommendations:

The Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey.

References:

Great Basin GEM Joint Venture, 1983, Lake Mead G-E-M resources area (GRA no. NV-35) technical report (WSA's NV-050-0231, 050-0233, 050-0235, 050-0236, and 050-0238): Prepared for the U.S. Bureau of Land Management, contract YA-553-RFP2-1054, 33 p.

Longwell, C.R., Pampeyan, E.H., Bowyer, Ben, and Roberts, R.J., 1965, Geology and mineral deposits of Clark County, Nevada: Nevada Bureau of Mines Bulletin 62, 218 p.



EXPLANATION

M/B Geologic terrane having moderate mineral resource potential for gold, silver, copper, lead, zinc, beryllium, feldspar, and mica with certainty level B

Mineral resources of the Bonelli Peak Wilderness Study Area.

Area number:

Size (acres):

Buffalo Hills CA-020-619 47,315

Status of

mineral surveys:

This area was not studied by the U.S. Geological Survey or the

U.S. Bureau of Mines.



Identified mineral resources (known):

No known mineral occurrences or deposits are present within the wilderness study area.

Mineral resource potential

(undiscovered):

The study area has moderate mineral resource potential for gold, silver, copper, lead, and zinc. Areas of volcanic-derived sediments and lake deposits have moderate resource potential for clay, zeolites, and pozzolan.

Mining activity:

There is no known mineral production from the wilderness study area. No current mining claims are located within the wilderness study area according to 1988 U.S. Bureau of Land Management records. The area is not within any mining districts and no locations are shown in MILS.

Mineral setting:

The study area is entirely within an extensive area of Miocene to Pliocene olivine basalt flows and dikes. Minor tuff and volcanic derived sediments including shale, sandstone, mudstone, and lake sediments, occur locally. Several north trending faults occur in the study area. Sedimentary rocks in this area are also known to contain abundant vertebrate and plant fossils of Barstovian age.

Recommendations:

The wilderness study area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and U.S. Geological Survey. Future work in the area, in the form of geologic mapping and detailed geochemical sampling is needed to accurately assess the potential for precious and metallic mineral occurrences, and the sediment associated resources, zeolite, clay, and pozzolan.

References:

Bonham, H.F., 1969, Geology, and mineral deposits of Washoe and Storey Counties, Nevada: Nevada Bureau of Mines Bulletin 70, 140 p.

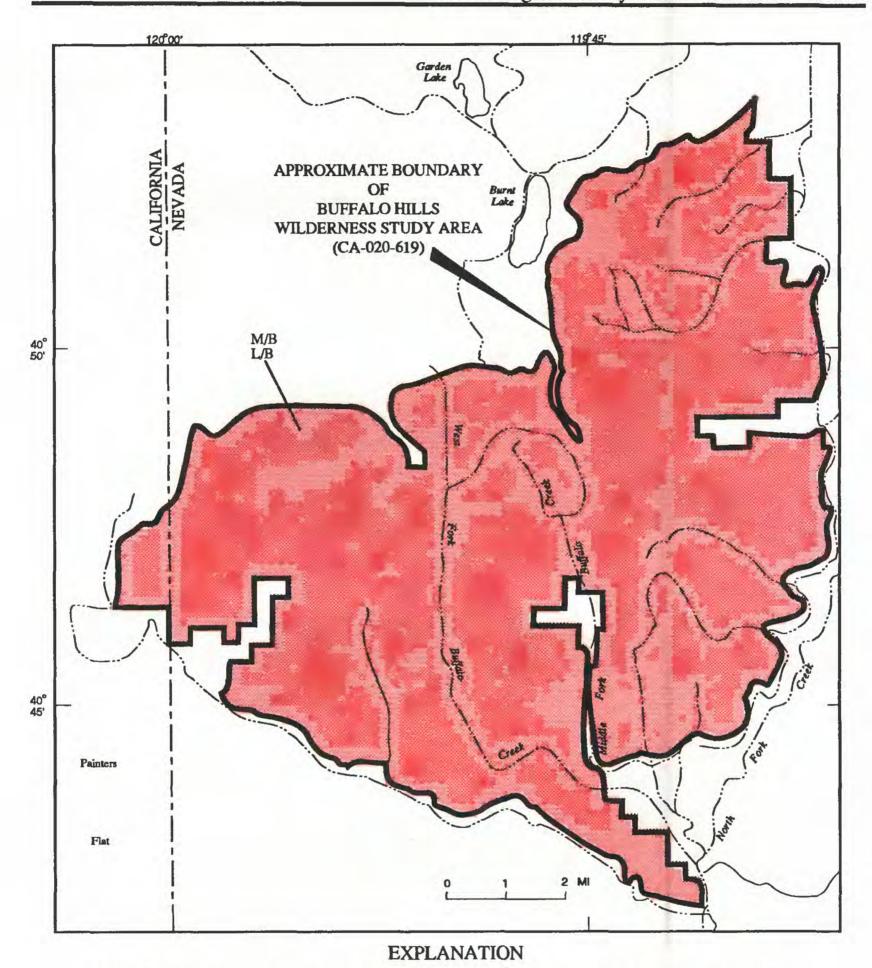
Clark, W.B., 1970, Gold districts of California: California Division of Mines and Geology Bulletin 193, 186 p.

Lydon, P.A., Gay, T.E., Jr., and Jennings, O.P., compilers, 1976, Westwood (Susanville) sheet: California Division of Mines and Geology Geologic Map of California, scale 1:250,000.

U.S. Bureau of Land Management, 1989, California state-wide wilderness study report: draft copy, part 3, v. 2.

U.S. Bureau of Mines, 1989, Mineral Industry Location System (MILS).

Vercouter, T.C., Sorensen, M.L., Frisken, J.G., and Plouff, Donald, 1988, Mineral resources of the Twin Peaks Wilderness Study Area, Washoe County Nevada, and Lassen County, California: U.S. Geological Survey Bulletin 1706-A, 13 p.



M/B Geologic terrane having moderate mineral resource potential for gold, silver, copper, lead, zinc, clay, zeolites, pozzolan with certainty level B

L/B Geologic terrane having low mineral resource potential for geothermal energy with certainty level B

Mineral resources of the Buffalo Hills Wilderness Study Area.

Area number:

Burbank Canyon NV-030-525A

Size (acres): 13,395

Status of mineral surveys: This area was not studied by the U.S. Bureau of Mines or the U.S.

Geological Survey.

Identified mineral resources (known):

No mineral resources have been identified within the Wilderness Study Area.

Mineral resource potential (undiscovered):

The Burbank Canyon area has a high potential for gold, silver, lead, and zinc vein deposits, copper and tungsten skarns, and porphyry molybdenum and copper deposits. Deposits of these types are known from surface exposures (Red Canyon and Gardnerville mining districts) or from company drilling within or near the proposed wilderness area. A low potential exists for development of geothermal energy along mountain frontal faults on the east side of the area.

Mining activity: The Burbank Canyon WSA occupies much of the eastern half of the Red Canyon mining district. The Red Canyon district is credited with more than \$100,000 production of gold and silver. Most of this production came from the Longfellow mine, in the WSA. The San Juan-El Capitan mine also produced gold from the WSA.

Silver-lead-zinc production is recorded from the Lucky Bill mine, about one mile north of the WSA. Silver production is credited to the Vera Grande property, about seven miles west of the WSA.

The Mountain Gold patented claims, near the southern boundary, have been cherry-stemmed out of the WSA. Dixon (1971) noted other occurrences and geochemically anomalous sites in the WSA.

July 1989 BLM records show at least 30 unpatented mining claims active in the WSA.

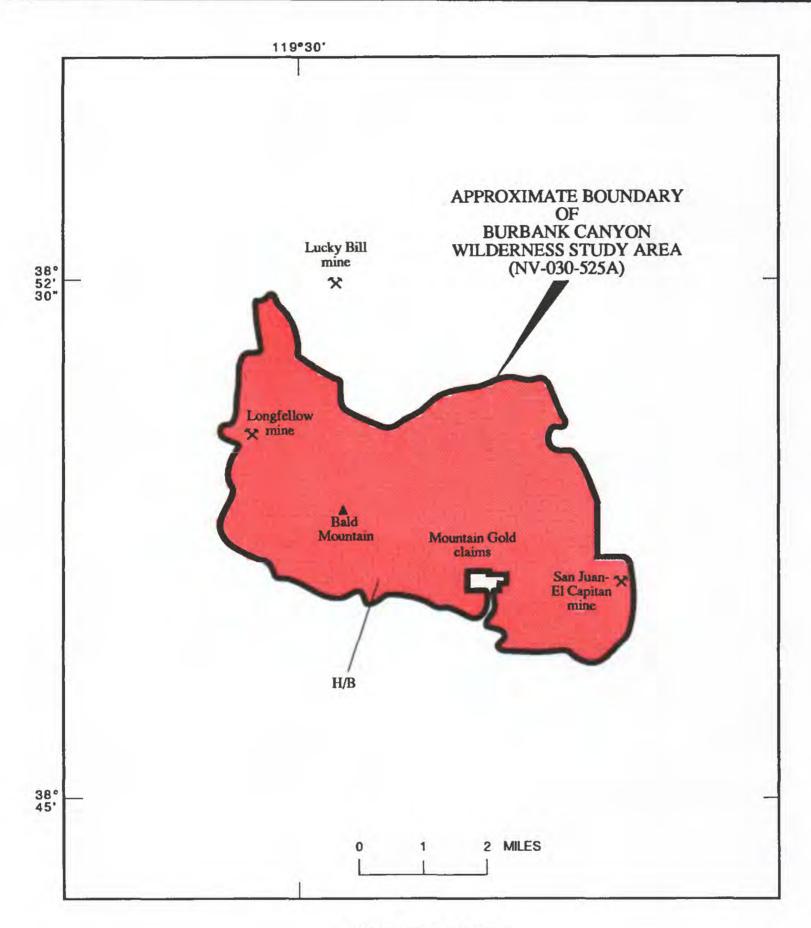
Mineral setting:

The Burbank Canyon area forms the eastern part of a major basin and range fault block comprising the southern Pine Nut Range. Rocks in the area consist of a thick sequence of Triassic and Jurassic marine and nonmarine sedimentary and volcanic rocks intruded by Cretaceous granitic and dioritic rocks. A relatively small part of the area is covered by Tertiary andesitic flows and breccias.

Recommendations: Because of the previous production, reported geochemical anomalies, and patented and unpatented mining claims, the wilderness study area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey.

References:

- Dixon, R.L., 1971, The geology and ore deposits of the Red Canyon mining district, Douglas County, Nevada: Reno, University of Nevada MS thesis, 88 p.
- Great Basin GEM Joint Venture, 1983, Burbank Canyon G-E-M Resource Area (GRA No. NV-10) Technical Report (WSA NV 030-525A): Reno, Nevada, Great Basin GEM Joint Venture for U.S. Bureau of Land Management contract YA-554-RFP2-1054 Open-File Report, 30 p.
- Hill, J.M., 1915, Some mining districts in northeastern California and northwestern Nevada: U.S. Geological Survey Bulletin 594, 200 p.
- Moore, J.G., 1969, Geology and mineral deposits of Lyon, Douglas, and Ormsby Counties, Nevada: Nevada Bureau of Mines and Geology Bulletin 75, 45 p.
- Overton, T.D., 1947, Mineral resources of Douglas, Ormsby, and Washoe Counties, Nevada: Nevada Bureau of Mines Bulletin 46, 91 p.



EXPLANATION

H/B Geologic terrane having high mineral resource potential for gold, silver, lead, zinc, tungsten, copper, and molybdenum with certainty level B

Mineral resources of the Burbank Canyon Wilderness Study Area.

Area number: Size (acres):

Calico Mountains NV-020-019

67,647

Status of

mineral surveys:

This area has not been studied by the U.S. Bureau of Mines or the U.S.

Geological Survey.

Identified mineral

resources (known):

No mineral resources have been identified in the Wilderness Study Area.

Extensive areas of sand and gravel occur within the WSA. However, the distance to markets combined with the abundance of these commodities in the region prevent these materials from being classified as identified

resources.

Mineral resource potential

(undiscovered):

Resource potential for epithermal gold and (or) silver deposits is moderate in the older granitic and metamorphic rocks and low in the rest of the area. Resource potential for perlite (for use in plaster and insulation), pozzolan (for use in cement), and uranium is low in the area underlain by the Tertiary rocks. Resource potential for geothermal energy is moderate in the entire area. No evidence is available to indicate

the presence of any resource potential for oil or gas in this area.

Mining activity: There may have been some turquoise produced from the JJ and Will claims. Geochemical exploration and some drilling are reported in the area.

July 1989 BLM records show 460 claims in the WSA. These include blocks by Lacana Gold Incorporated, Placer Dome U.S., Incorporated, Dragonfly Mining Company, Callahan Mining Corporation, and Ferret Exploration Company.

Mineral setting:

The area is underlain largely by lava flows and pyroclastic rocks, interlayered with sedimentary rocks. Older granitic and metamorphic rocks that presumably underlie the Tertiary rocks, are exposed in small

belt in the northern part of the area.

Recommendations: The Wilderness Study Area should be studied as part of a comprehensive

mineral survey by the U.S. Bureau of Mines and the U.S. Geological

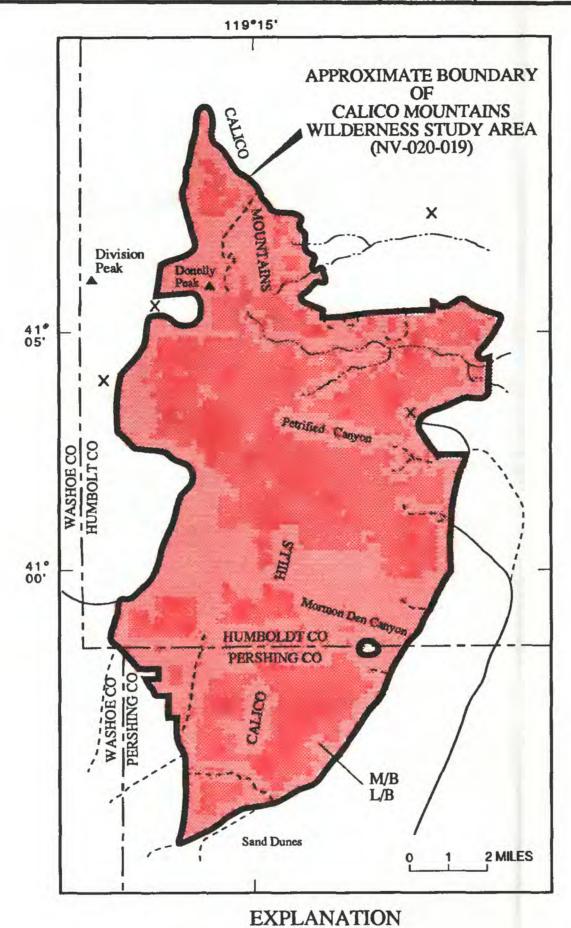
Survey.

References:

Barringer Resources, Inc., 1982, Geochemical and geostatistical evaluation of wilderness study areas, Winnemucca district, northwest Nevada, 5 v.: Golden, Colo. (available from NTIS, U.S. Department of Commerce, Springfield, VA 22161, or call Information Center and Bookstore (202) 377-0365).

Johnson, M.G., 1977, Geology and Mineral Deposits of Pershing County, Nevada: Nevada Bureau of Mines and Geology Bull. 89. 115 p.

- Muffler, L.J.P., ed., 1978, Assessment of geothermal resources of the United States-1978: U.S. Geological Survey Circular 790, 163p.
- Neumann, Terry R. and Close, Terry J., 1985, Mineral Resources of the High Rock Lake Wilderness Study Area (BLM No. NV-020-07), Humboldt County, Nevada: U.S. Bureau of Mines Open File Report MLA 38-85, 14 p.
- Sandberg, C.A., 1983, Petroleum potential of wilderness lands in Nevada, in Miller, B.M., ed., Petroleum potential of wilderness lands in the western United States: U.S. Geological Circular 902-A-P, p. H1-H11.
- Wilden, Ronald, 1964, Geology and mineral deposits of Humboldt County, Nevada: Nevada Bureau of Mines Bulletin 59, 115 p.,



M/B Geologic terrane having moderate mineral resource potential for gold, silver, and geothermal with certainty level B

L/B Geologic terrane having low mineral resource potential for perlite, pozzolan, and uranium with certainty level B

Mineral resources of the Calico Mountains Wilderness Study Area.

Area number:

Carson Iceberg NV-030-532

Size (acres):

550

Status of mineral surveys: This area has been studied as part of mineral surveys by the U.S. Bureau of Mines (Miller, 1988) and U.S. Geological Survey (Keith and Miller,

1988).

Identified mineral resources (known):

No mineral resources are identified in the wilderness study area.

Mineral resource potential (undiscovered): The study area has low resource potential for gold in placer deposits in gravels from the Carson River and some of its tributaries. The study area exclusive of the stream sediments also has low resource potential for silver in small vein type deposits.

Mining activity: The Log Cabin (Dixon) Mine, about 2 miles northwest, is estimated to have 900,000 tons of indicated marginal reserves with 0.1 to 0.4 troy ounce of gold per ton (Keith and others, 1983). Production from the Silver Mountain mining district, which includes most of the study area, has not all been recorded but is estimated to have been at least \$300,000 (Clark, 1977, p. 28)

The Wilderness Study Area has one small, abandoned prospect pit but no active mines or claims (July 1989 BLM records). Groups of active mining claims lie to the west and north, outside the WSA.

Mineral setting:

The area is underlain by a thin layer of interbedded lava flows and mudflows of Tertiary age overlying a granitic pluton of Cretaceous age. Locally, both of these units have been intruded by younger rhyolitic dikes.

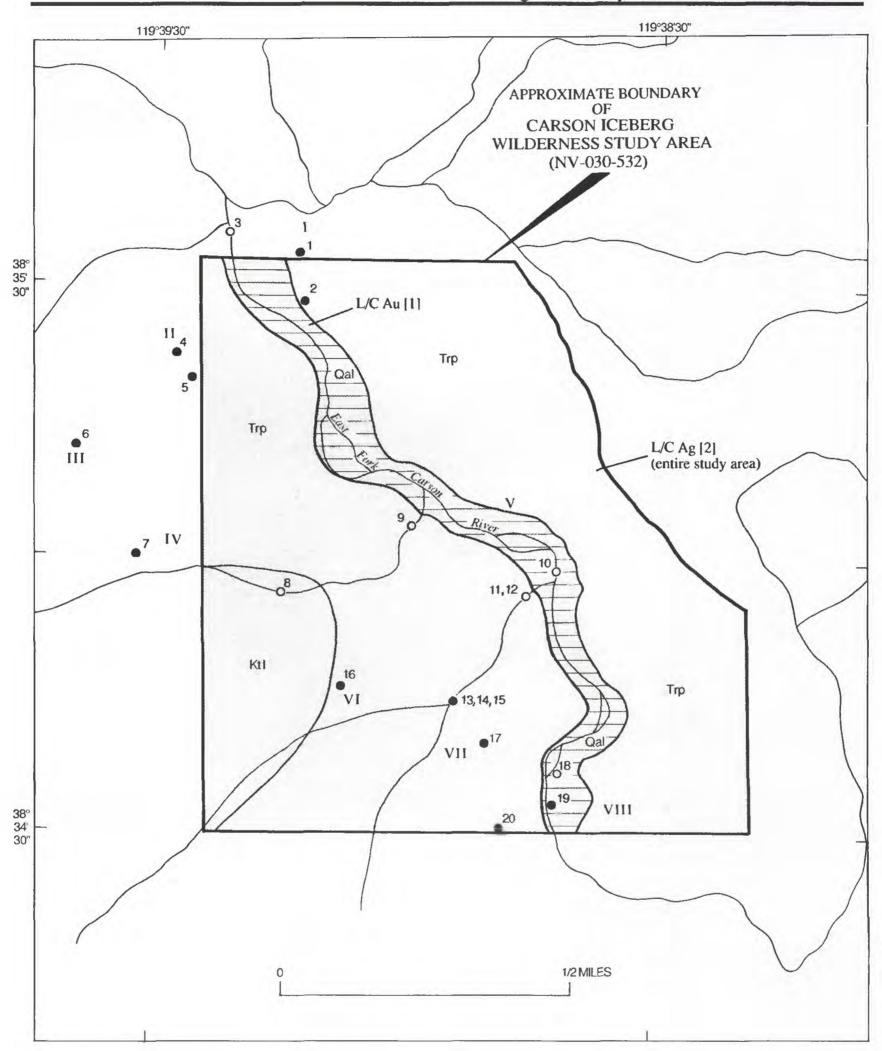
Recommendations: Additional work is not recommended for this area due to the small size of the area, the small amount of hydrothermal alteration, and the small number of and concentrations in geochemical anomalies.

References:

Clark, W.B., 1977, Mines and mineral resources of Alpine County, California, with sections on the Zaca gold-silver mine and the Leviathan sulfur mine by James R. Evans: California Division of Mines and Geology County Report 8, 48 p.

Keith, W.J., Chaffee, M.A., Plouff, Donald, and Miller, M.S., 1983, Mineral resource potential of the Carson-Iceberg Roadless Areas, central Sierra Nevada, California: U.S. Geological Survey Miscellaneous Field Studies Map MF-1416-B, scale 1:62,500.

- Keith, W.J., and Miller, M.S., 1988, Mineral Resources of the Carson Iceberg Wilderness Study Area, Alpine County, California: U.S. Geological Survey Open-File Report 88-273, 22 p.
- Miller, M.S., 1988, Mineral Resources of the Carson-Iceberg Wilderness Study Area, Alpine County, California: U.S. Bureau of Mines Open File Report MLA 18-88, 20 p.
- Purdy, T.L., and Rowan, L.C., 1985, Map showing distribution of altered rocks, faults, and linear features in the Walker Lake 1° by 2° Quadrangle, Nevada and California: U.S. Geological Survey Miscellaneous Investigations Map I-1643, scale 1:250,000.
- Rowan, L.C., Krohn, M.D., and Purdy, T.L., compilers, 1980, Generalized map of occurrences of limonitic rocks in the Walker Lake 1° by 2° Quadrangle, California and Nevada: U.S. Geological Survey Open-File Report 80-232, scale 1:250,000.



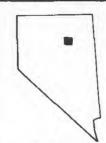
Mineral resources of the Carson Iceberg Wilderness Study Area.

EXPLANATION

	Area with low mineral resource potential (L)
C	Certainty level of assessment—Data give good indication of level of potential
	COMMODITIES
Au Ag	Gold Silver
[]	TYPE OF DEPOSIT OR OCCURRENCE
1 2	Placer Disseminated epithermal
	GEOLOGIC MAP UNITS
Qal	Alluvium (Quaternary)—Unconsolidated silt, sand, and gravel
Trp	Relief Peak Formation (Tertiary)—Interbedded andesitic lava flows, lahars, and sedimentary rocks
Ktl	Granodiorite of Topaz Lake (Cretaceous)—Coarsely prophyritic granodiorite
	Contact
•2	Rock sample location
_o 3	Alluvium sample location
IV	Site location—May cover large area and contain more than one sample locality (see table 1, appendixes)

Area number: Size (acres):

Cedar Ridge NV-010-088 10,009



Status of

mineral surveys:

This area was not studied by the U.S. Bureau of Mines or U.S.

Geological Survey.

Identified mineral resources (known):

No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential (undiscovered): The entire area is underlain by Paleozoic rocks and considered to have low potential for resources of gold, because it lies within the central Nevada disseminated gold deposit belt. The NW alignment of many carbonate hosted gold deposits in Nevada suggests that there is some type of subtle geologic control on mineralization in this belt. The area has high potential for oil and gas (Sandberg, 1982; 1983).

Mining activity: There no known active mines within the WSA. July 1989 BLM records show 12 active and 3 inactive mining claim locations within or adjacent to the WSA.

Mineral setting:

The central one third of the area (Cedar Ridge) is comprised of conglomerate, limy sandstone and limestone of upper Paleozoic age. The bounding valleys contain unconsolidated alluvium mostly of Quaternary age.

Recommendations: Because of its location in the central Nevada disseminated gold belt, geochemical sampling of stream sediments and rock samples looking for Au, Ag, and trace elements commonly associated with these precious metals, are recommended, as well as seismic reflection studies to define the Paleozoic bedrock surface and other reflectors that might define structures favorable for oil. The Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey.

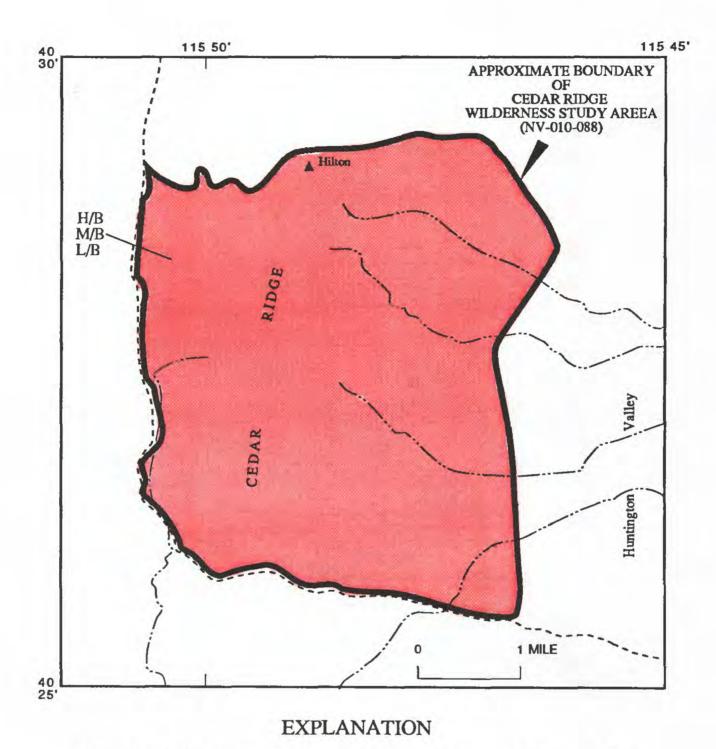
References:

Matthews, G.W. and Blackburn, W.H., 1983, Cedar Ridge Gem Resource Area (NV-010-05), Elko County, Nevada: TERRADATA, (BLM Contract No. YA-553-CT2-1042).

Nevada Mining Association, 1988, Nevada BLM Wilderness Study Areas, Mineral Potential Handbook: unpublished report.

Sandberg, C.A., 1982, Petroleum potential of wilderness Lands, Nevada: U.S. Geological Survey Miscellaneous Investigation Series Map I-1542.

Sandberg, C.A., 1983, Petroleum potential of wilderness lands in Nevada, *in* Miller, B.M., ed., Petroleum potential of wilderness lands in the western United States: U.S. Geological Circular 902-A-P, p. H1-H11.



H/B Geologic terrane having high mineral resource potential for oil and gas with certainty level B

- M/B Geologic terrane having moderate mineral resource potential for oil and gas with certainty level B
- L/B Geologic terrane having low mineral resource potential for gold, and oil and gas with certainty level B

Mineral resources of the Cedar Ridge Wilderness Study Area.

Area number:

China Mountain NV-020-406P

Size (acres):

10,358

Status of

mineral surveys:

This area was not studied by the U.S. Bureau of Mines or the U.S.

Geological Survey

Identified mineral resources (known):

No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential (undiscovered):

The study area has low potential for undiscovered mineral resources of antimony, copper, gold, lead, silver, and zinc.

Mining activity:

At least one mine in the study area, the Ore Drag, has had past production. It was first worked in the early 1940's, and produced approximately 34 tons of ore containing antimony, tungsten, and small amounts of silver. Within one mile of the northeast corner of the area, 5,331 oz of silver, 3 oz of gold, 800 lbs of copper, and 66,700 lbs of lead were recovered from 341 tons of ore from 1944 to 1945.

July 1989 BLM records show approximately 259 active mining claims in the WSA. Many of the claims are along a swarm of northwest-trending faults in the vicinity of Hoffman Canyon. Hecla Mining recently abandoned 19 additional claims.

Mineral setting:

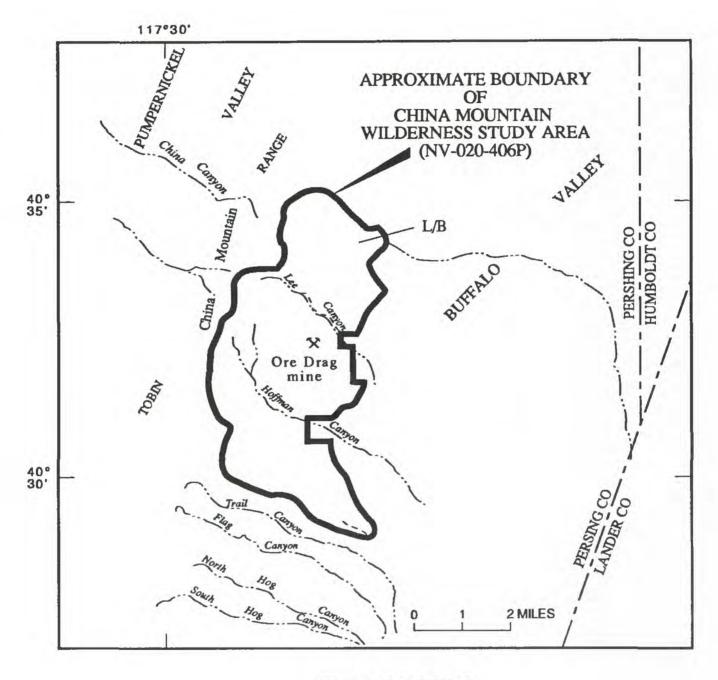
The southern part of the study area is underlain by upper Paleozoic and Triassic sedimentary and metamorphic rocks that consist of chert, argillite, shale, greenstone, and minor amounts of siltstone, sandstone, conglomerate, and limestone. In the north part of the study area, these rocks are overlain by lower Triassic andesite flows, rhyolite tuffs and clastic rocks. All of these rocks are cut by several north-trending faults. The southeastern part of the study area is downdropped by a northeast-trending range front fault zone.

Recommendations:

The Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey.

References:

Johnson, M.G., 1977, Geology and mineral resources of Pershing County, Nevada: Nevada Bureau of Mines and Geology Bulletin 89, 115 p.



EXPLANATION

L/B Geologic terrane having low mineral resource potential for antimony, copper, gold, silver, lead, and zinc with certainty level B

Mineral resources of the China Mountain Wilderness Study Area.

Clan Alpine Mountains

Area number:

NV-030-102

Size (acres):

196,128 of which 68,458 were studied at the request of the U.S. Bureau of Land Management.

Status of

mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of

Mines (Hardyman and others, 1988).

Identified mineral resources (known):

No mineral resources have been identified in the Wilderness Study Area. Small amounts gold, silver, and antimony have been produced from mines in the Alpine mining district, which includes the northern part of the WSA. The Wonder mining district, located about three miles south of the WSA, was a major producer of silver and gold. Within the area studied, a zone near the headwaters of Starr Canyon contains anomalous

amounts of silver and gold.

Mineral resource potential (undiscovered):

The Clan Alpine Mountains Wilderness Study Area contains one area of high mineral resource potential and two areas of moderate mineral resource potential for undiscovered gold and silver resources, two areas of moderate mineral resource potential for undiscovered molybdenum resources, and two areas of moderate mineral resource potential for undiscovered antimony resources. The rest of the area has a low potential for these and all other undiscovered metals, and the entire area has a low resource potential for undiscovered oil and gas and geothermal energy. A small area along the east-central margin of the study area has low mineral resource potential for undiscovered zeolite resources.

Mining activity:

There are no known active mines in the WSA. The Tungsten Mountain mine was active between 1954 and 1961, and the Nevada Gold group produced much of the Alpine mining district's gold, silver, and lead prior to 1940. The Antimony King mine was active in 1983.

BLM mining records (July 1989) show approximately 673 active and 635 inactive claims dating from 1951 located within or adjacent to the WSA.

Mineral setting:

Rocks exposed in the study area are chiefly Tertiary (see geologic time chart in appendix) igneous rocks and minor amounts of Mesozoic sedimentary rocks.

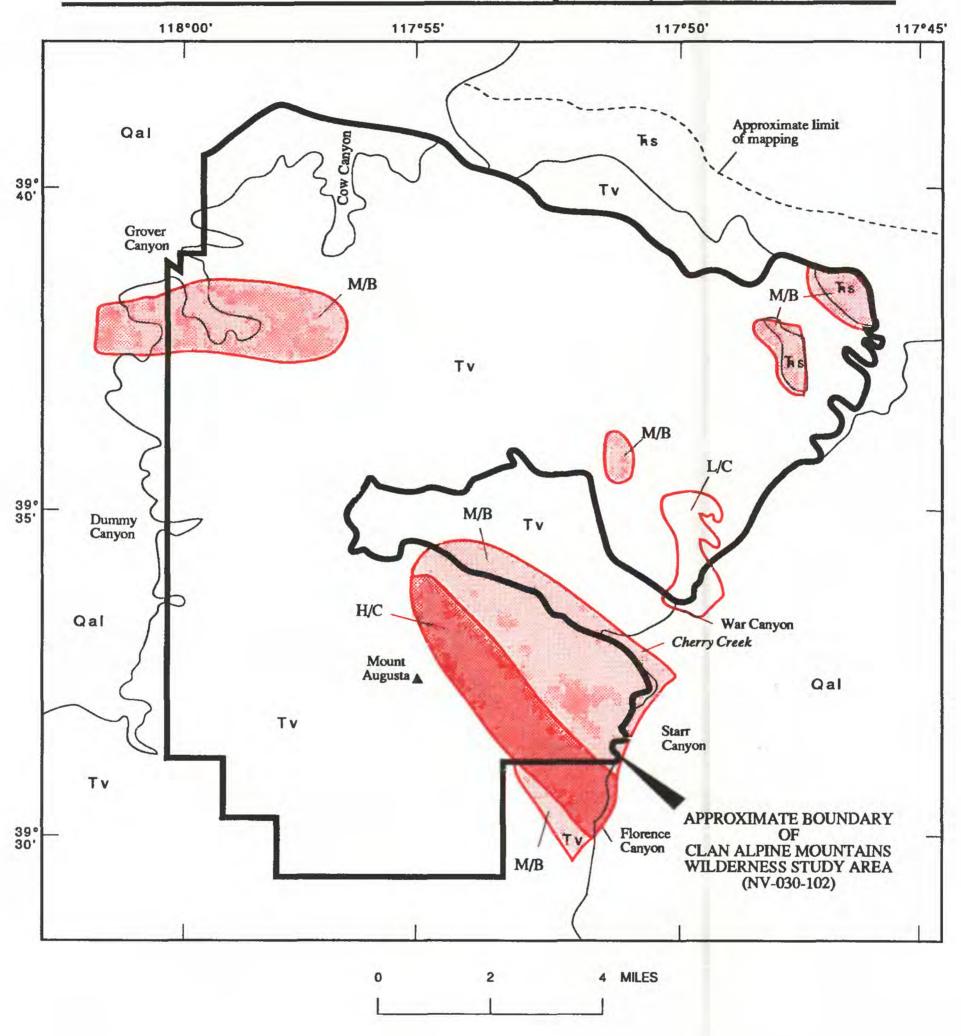
Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 127,670 acres that constitute the balance. The anomalous zone within the area studied warrants additional examination.

References:

Great Basin GEM Joint Venture, 1983, Clan Alpine Mountains G-E-M Resources Area (GRA No. NV.-5) Technical Report (WSA NV-030-102): Prepared for the U.S. Bureau of Land Management, contract YA-554-RFP-1054, 38 p.

- Hardyman, R.F., Brooks, W.E., Blaskowski, M.J., Barton, H.N., Ponce, D.A., and Olson, J.E., 1988, Mineral resources of the Clan Alpine Mountains Wilderness Study Area, Churchill County, Nevada: U.S. Geological Survey Bulletin 1727-B, 16 p.
- Nevada Mining Association, 1988, Nevada BLM Wilderness Study Areas, Mineral Potential Handbook: unpublished report.
- Olson, J.E., 1988, Mineral resources of the Clan Alpine Mountains Study Area, Churchill County, Nevada: U.S. Bureau of Mines Open File Report MLA 4-87, 22 p.

Nevada Briefing Book U.S. Geological Survey and U.S. Bureau of Mines



Mineral resources of the Clan Alpine Mountains Wilderness Study Area.

EXPLANATION

[Entire study area has a low mineral resource potential for all metals (except as noted below), at certainty level B, and for geothermal energy, oil and gas, at certainty level C]

H/C	Geologic terrane having high mineral resource potential for gold and silver, at certainty level C
M/B	Geologic terrane having moderate mineral resource potential for gold and silver, at certainty level B
M/B	Geologic terrane having moderate mineral resource potential for molybdenum, at certainty level B
M/B	Geologic terrane having moderate mineral resource potential for antimony, at certainty level B
L/C	Geologic terrane having low mineral resource potential for zeolites, at certainty level C
Qal	Quaternary alluvium
Tv	Tertiary volcanic rocks
Tas	Triassic sedimentary rocks
	Geologic contact
	Levels of certainty
В	Data indicate geologic environment and suggest level of resource potential
С	Data indicate geologic environment and give good indication of level of resource potential but do not establish activity of resource-forming processes

Explanation, mineral resources of the Clan Alpine Mountains Wilderness Study Area.

Area number:

Size (acres):

Clover Mountains NV-050-139

84,935 of which 84,165 were studied at the request of the U.S. Bureau of

Land Management.

Status of mineral surveys: Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of

Mines (Moring and others, 1988).

Identified mineral resources (known):

No mineral resources have been identified in the Wilderness Study Area. However, clinoptilolite, a zeolite mineral, occurs near Fountain of Youth Spring in the central part of the study area. Deposits of stone, sand, and gravel in the study area are suitable for local construction uses, but

distance to markets make development unlikely.

Mineral resource potential (undiscovered):

A mineral resource assessment for the Clover Mountains Wilderness Study Area was completed by Moring and others (1988). The results from this study indicate that two areas in the north part of the study area have moderate resource potential for molybdenum. Most of the southern part of the area has low potential for gold, silver, zeolites, and oil and gas resources. Occurrences of sand, gravel, and stone in the study area are too inaccessible and remote to have any significant resource potential.

Mining activity: The Pennsylvania Copper Mine (Hope Mine) produced \$70,000 in gold, silver, lead, and copper before 1986. The Lucky Boy barite mine is not active. Barium was produced from barite veinlets in volcanics.

July 1989 BLM records show 405 claims in and near the WSA. These include claim blocks by Lincoln Exploration Company, Lana Resources U.S. Inc., Houston International Mineral Corporation (molybdenum), Amoco Minerals Company, Lana Gold Corporation, U.S. (silver, copper, and gold).

Mineral setting:

The Clover Mountains Wilderness Study Area lies along the southern edge of the Caliente cauldron complex of Ekren and others (1977). The study area is underlain mostly by ash-flow tuff and other associated volcanic rocks derived from the cauldron complex. Folded and faulted Paleozoic and Mesozoic sedimentary rocks crop out outside the caldera margin in the south and west parts of the study area.

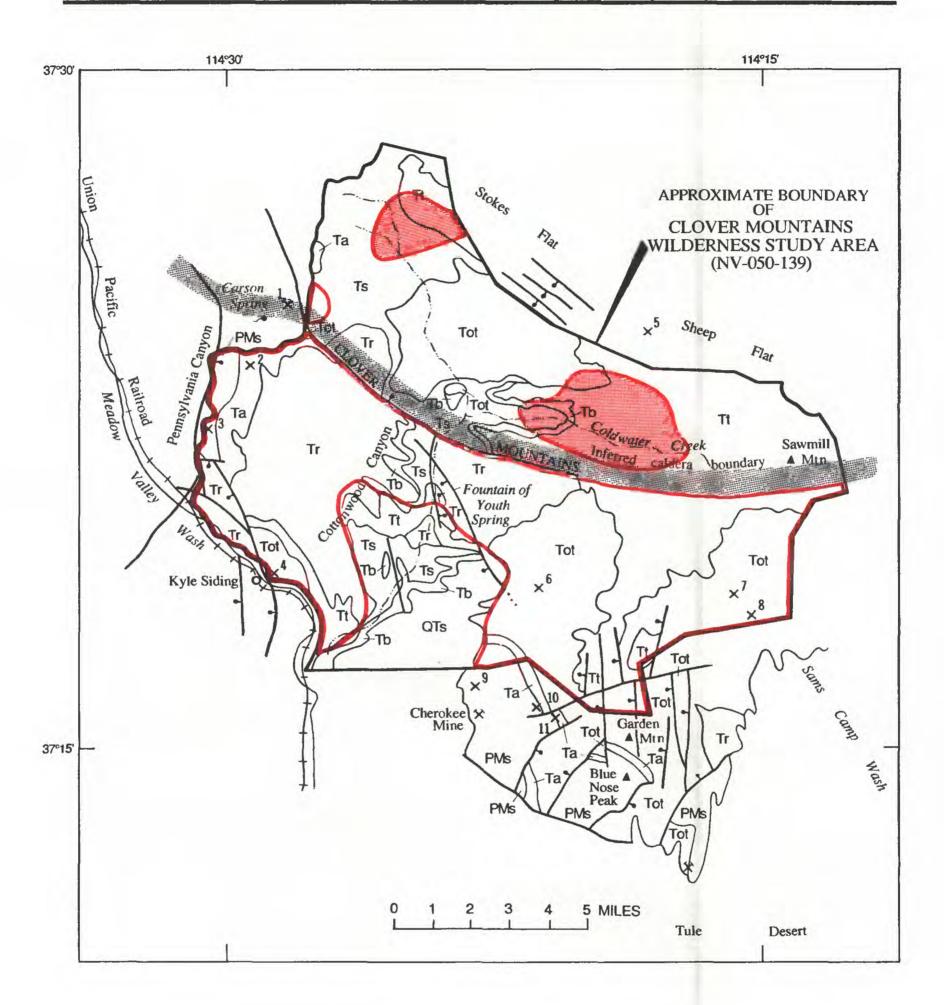
Recommendations: No further work is recommended.

References:

Ekren, E.B., Orkild, P.P., Sargent, K.A., and Dixon, G.L., 1977, Geologic map of Tertiary rocks, Lincoln County, Nevada: U.S. Geological Survey Miscellaneous Investigations Map I-1041, scale 1:250,000.

Horton, 1963, An Inventory of Barite Occurrences in Nevada: Nevada Bureau of Mines and Geology, Report 4.

- McHugh, E.L., 1987, Mineral resources of the Clover Mountains study area, Lincoln County, Nevada: U.S. Bureau of Mines Open-File Report MLA 28-87, 29 p.
- Moring, Barry, Blank, H.R., Jr., Hoffman, J.D., and McHugh, E.L., 1988, Mineral resources of the Clover Mountains Wilderness Study Area, Lincoln County, Nevada: U.S. Geological Survey Bulletin 1729-D, 18 p.
- Noble, D.C., and McKee, E.H., 1972, Description and K-Ar ages of volcanic rocks of the Caliente volcanic field, Lincoln County, Nevada, and Washington County, Utah: Isochron/West, no. 5, p. 17-24.
- Papke, 1983, Barite in Nevada: Nevada Bureau of Mines and Geology, Bull. 98.
- Tschanz, C.M., and Pampeyan, E.H., 1970, Geology and mineral resources of Lincoln County, Nevada: Nevada Bureau of Mines and Geology Bulletin 73, 183 p.



Mineral resources of the Clover Mountains Wilderness Study Area.

EXPLANATION

	EXI EXIVATION
	Area with moderate mineral resource potential (M)
	Area with low mineral resource potential (L)
	Level of certainty of assessment
B C	Data only suggest level of potential Data give good indication of level of potential
	Commodities
Мо	Molybdenum
Ag	Silver
Au	Gold
Zeo	Zeolite
O,G	Oil and gas
	Mine and prospects
1.	Pennsylvania mine
2.	Iron Blossom prospect
3.	Bobcat prospect
4.	Kyle Siding prospect
5.	Grandview prospect
6.	Yon prospect
7.	Gold 23-31 prospect
8.	Gold 1–22 prospect
9.	Wall Street prospect
10.	Gold Chance prospect
11.	Cherokee 1-12 prospect
	Geologic map units
QTs	Surficial deposits (Quaternary and Tertiary)
Tt	Tuffaceous rocks (Tertiary)
Ts	Sedimentary rocks (Tertiary)
Tb	Basalt (Tertiary)
Tr	Rhyolite (Tertiary)
Tot	Older tuffaceous rocks (Tertiary)
Ta	Andesite (Tertiary)
PMs	Sedimentary rocks (Paleozoic and Mesozoic)
-	Contact
	- Fault-Bar and ball on downthrown side
	Inferred caldera margin
× ⁶	Prospect or mine—Numbers refer to table 1

Explanation, mineral resources of the Clover Mountains Wilderness Study Area.

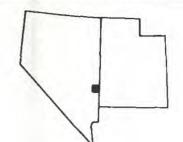
Cougar Canyon (Tunnel Springs)

Area number:

UT-040-123/NV-050-166

Size (acres):

15,968 acres (5,400 acres in Nev., 10,568 acres in Utah) of which 6,408 were studied at the request of the U.S. Bureau of Land Management.



Status of

mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of

Mines (Conrad and others, 1990).

Identified mineral resources (known):

No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential (undiscovered):

The geologic environment is permissive for small deposits of a number of base- and precious-metals, including gold, silver, copper, lead, zinc, mercury, and molybdenum, but there is no indication that any of these commodities are present in appreciable amounts in the study area (Tschanz and Pampeyan, 1970; Conrad and others, 1990). Minor hydrothermal alteration, present several miles south of the study area, and locally abundant faulting that would provide pathways for metal-bearing hydrothermal fluids, suggest that there is low potential for gold, silver, copper, and mercury in the study area. There is low potential for zeolite and perlite resources as well as cinders and building stone, but the area is located far from major markets. There is no potential for oil and gas.

Mining activity: No mining districts, or mines are known in the WSA. The Acoma perlite prospect lies 2 miles west of the area and the Sunnybrook gold prospect lies 2 miles south. The Orma-Valoy silver claims (nos.1-32) are within the WSA. Oil and gas leases blanket 15,730 acres of the WSA. A sample from the westernmost prospect pit near the southern boundary of the WSA, in Utah, contained 0.002 oz/ton gold.

Mineral setting:

The study area is located on the Nevada-Utah border adjacent to Beaver Dam State Park in Nevada and Pine Park State Park in Utah. Slightly to moderately tilted volcanic rocks of Miocene age, related to the nearby Caliente caldera complex (Noble and McKee, 1972; Ekren and others, 1977) are exposed in the area.

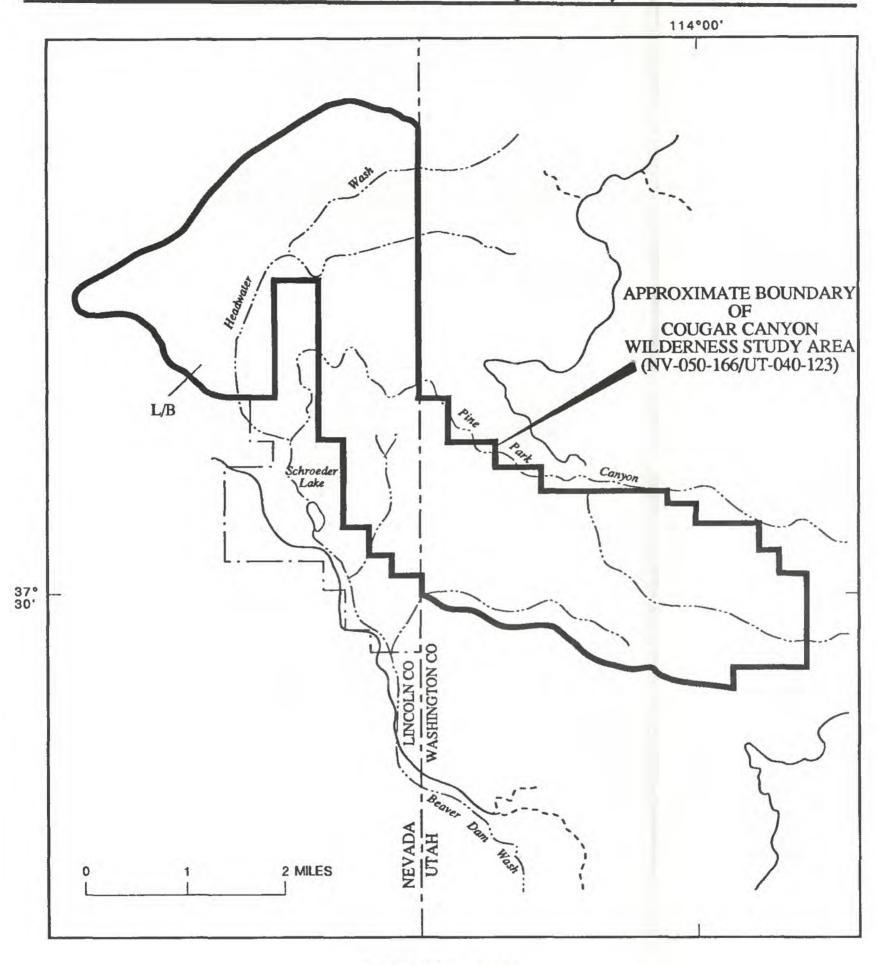
Recommendations:

As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 9,560 acres that constitute the balance.

References:

Conrad, J.E., King, H.D., Blank, H.R., Murphy, G.P., and Ryan, G.S., 1990, Mineral resources of the Cougar Canyon Wilderness Study Area, Lincoln County, Nevada, and Washington County, Utah: U.S. Geological Survey Open-File Report, 15 p.

- Cook, E.F., 1960, Geologic map of Washington County, Utah, (1:125,000), supplement to the geologic atlas of Utah, Washington County: Utah Geological and Mineralogical Survey Bulletin 70, 119 p.
- Ekren, E.B., Orkild, P.P., Sargent, K.A., and Dixon, G.L., 1977, Geologic map of Tertiary rocks, Lincoln County, Nevada: U.S. Geological Survey Miscellaneous Investigations Map I-1041, scale 1:250,000.
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- Nevada Mining Association, 1988, Nevada BLM Wilderness Study Areas, Mineral Potential Handbook: Reno, Nevada, unnumbered pages.
- Noble, D.C., and McKee, E.H., 1972, Description and K-Ar ages of volcanic rocks of the Caliente volcanic field, Lincoln County, Nevada, and Washington County, Utah: Isochron/West, no. 5, p. 17-24.
- Oakes, Ed, Wedow, Helmuth, Poling, Robert, and Voelker, Al, 1981, The Depart- ment of Energy's energy-resource evaluation of wilderness study areas administered by the Bureau of Land Management, Cedar City district, Utah: Prepared for; Leasing Policy Development Office, Department of Energy, 317 p.
- Ryan, G.S., 1989, Mineral investigation of a part of the Cougar Canyon Wilderness Study Area (UT-040-123/NV-050-166), Washington County, Utah and Lincoln County, Nevada: U.S. Bureau of Mines Open-File Report MLA 21-89.
- Tschanz, C.M., and Pampeyan, E.H., 1970, Geology and mineral resources of Lincoln County, Nevada: Nevada Bureau of Mines and Geology Bulletin 73, 183 p.



EXPLANATION

L/B Geologic terrane having low mineral resource potential for gold, silver, copper, mercury, zeolites, perlite, cinders, and building stones with certainty level B

Mineral resources of the Cougar Canyon (Tunnel Springs) Wilderness Study Area.

Delamar Mountains

Area number:

NV-050-177

Size (acres):

126,257

Status of mineral surveys:

This area was not studied by the U.S. Geological Survey or the U.S.

Bureau of Mines.

Identified mineral resources (known):

No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential (undiscovered):

There is low potential for oil and gas in the Paleozoic rocks that underlie the area. The area is in the overthrust belt, and as of 1988, parts of the area were under lease by several different oil companies and private parties for oil and gas (Nevada Mining Association, 1988). Low potential also exists for deposits of silica, lime, and perlite in the area. The presence of the collapse caldera along the northeastern part of the study area may be a favorable locus for gold, mercury, lithium, and uranium mineralization; and the area is judged to have low potential for these and associated metallic resources.

Mining activity:

Gold prospecting first occurred within the Delamar Mountains, and this study area, in the early 1890's; production was from cherty and vuggy quartz in quartzite breccia and bedding planes. The WSA contains several prospects for gold, silver, and manganese with no recorded production. However, the Delamar Mining district, 6 miles to the north, contains at least 40 mines, prospects and workings, including the Delamar mine, one of the largest historical gold producers in Nevada. This area has experienced some mineral exploration within the last year by at least five major mining companies.

Current exploration includes the location of at least 22 lode claims in the southeast corner of the WSA, and an additional 16 lode claims outside the southeast corner of the WSA (July 1989 BLM records).

Minor sand and gravel production has occurred from at least one pit within the WSA. Most of the WSA has been leased for oil and gas. There are no known geothermal energy leases.

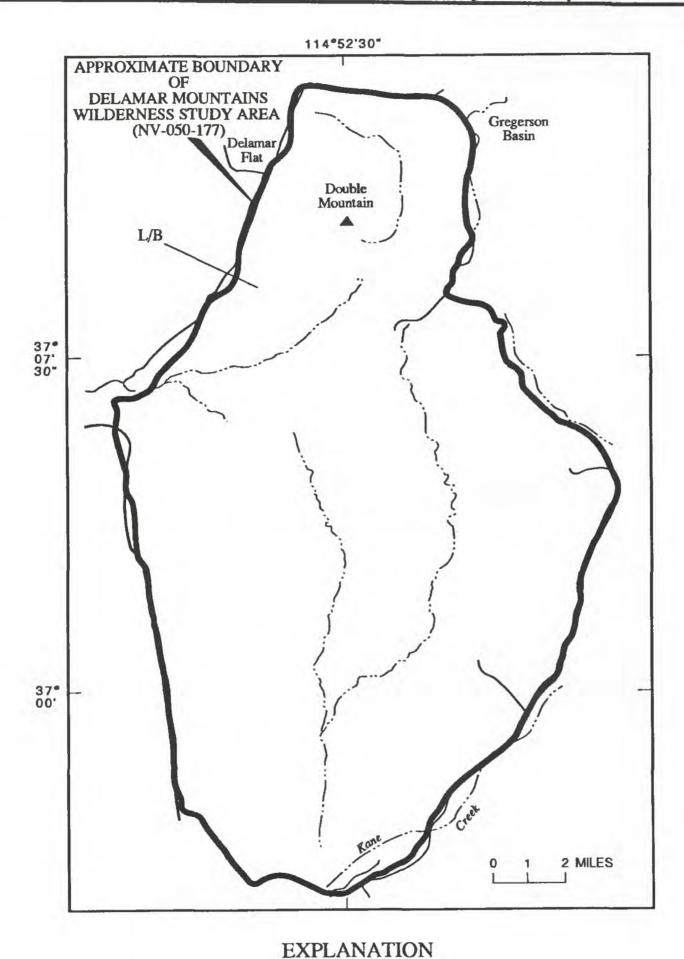
Mineral setting:

The western and southern parts of the study area consist of Paleozoic sedimentary rocks, including dolomite, limestone, shale, siltstone, and quartzite. The northern and central parts of the area consist of welded and non-welded silicic ash flow tuffs with interbedded air fall tuffs and local volcanic-derived sedimentary beds. The northeast part of the study area includes the margin of a collapse caldera that has associated rhyolite plugs and is partially filled with Tertiary basalt flows. Alluvial deposits are found in low-lying areas and along drainages (Barton and Day, 1984).

Recommendations: The presence of the collapse caldera may merit further work to determine if there is any significant gold, mercury, lithium, or uranium mineralization in the area, especially in view of the fact that there are reactive sedimentary rocks that are potential hosts for mineral deposits. Because of this, the wilderness study area should be studied as part of a comprehensive mineral survey by the Bureau of Mines and Geological Survey.

References:

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L/B Geologic terrane having low mineral resource potential for oil and gas, silica, lime, perlite, gold, mercury, lithium, uranium, and metals with certainty level B

Mineral resources of the Delamar Mountains Wilderness Study Area.

Desatoya Mountains

Area number:

NV-030-110

Size (acres):

51,262 of which 43,053 were studied at the request of the U.S. Bureau of

Land Management.

Status of

mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of

Mines (McKee and others, 1987).

Identified mineral resources (known):

No mineral resources have been identified in the Wilderness Study Area. Deposits of sand and gravel available for local consumption only do exist in the area. There are no mines with recorded production near the area.

Minerals that are known to occur in the area are gold, silver, and barite.

Mineral resource potential (undiscovered):

An area that includes a tributary of Topia Creek on the east edge of the study area is assigned a moderate potential for undiscovered gold and silver resources. In the northern part of the study area and in the Rock Creek and Gold Basin claim areas a low resource potential for undiscovered gold and silver is indicated. Occurrences of sand and gravel in the study area are too inaccessible and remote to have any significant resource potential.

Mining activity:

None.

Mineral setting:

The study area is underlain by a thick sequence of rhyolite welded tuffs and intrusive rocks mostly of Oligocene and (or) Miocene age (see appendix for geologic time chart). These volcanic and intrusive rocks are the products of a volcano that collapsed to form a large caldera located in the central part of what is now the Desatoya Mountains. This caldera, which formed about 24 million years ago, was subsequently filled with volcanic material before being greatly modified by basin and range faulting and by erosion.

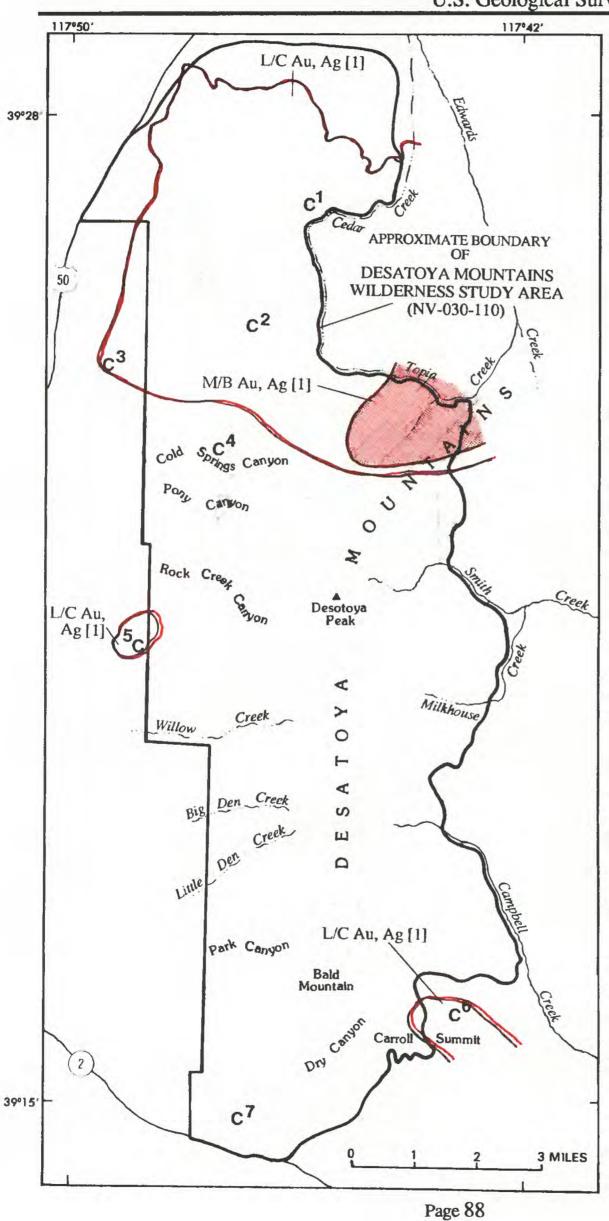
Recommendations:

There is some interest in minerals in this area. Samples taken for the GEM evaluation and the mineral evaluation done by the U.S. Bureau of Mines indicate the presence of gold and silver. Further testing and evaluation has been recommended by Phelps Dodge and ASARCO as well as the U.S.Bureau of Mines. In addition, as only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 8,209 acres that constitute the balance.

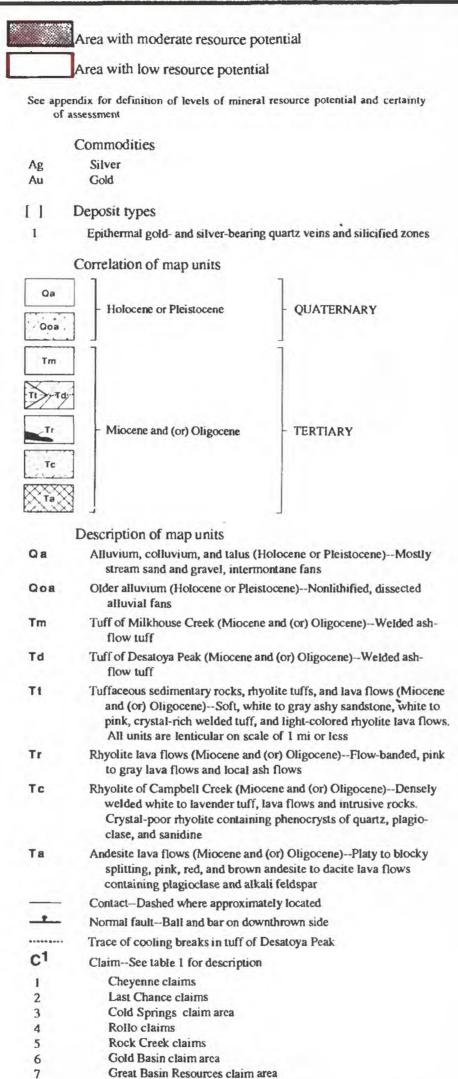
References:

Benjamin, D.A., 1986, Mineral Resources of the Desatoya Mountains Study Area, Churchill and Lander Counties, Nevada: U.S. Bureau of Mines Open File Report MLA 70-86, 28 p.

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- Stager, H.K., 1977, Geology and Mineral Deposits of Lander, County, Nevada: Nevada Bureau of Mines and Geology Bulletin 88, 106 p.
- Vanderburg, W.O., 1940, Reconnaissance of Mining Districts in Churchill County, Nevada: U.S. Bureau of Mines Information Circular 7093, 57 p.
- Wilden, R. and Speed, R.C., 1974, Geology and Mineral Deposits of Churchill, County, Nevada: Nevada Bureau of Mines and Geology Bulletin 83, 95 p.



Mineral resources of the Desatoya Mountains Wilderness Study Area.



Explanation, mineral resources of the Desatoya Mountains Wilderness Study Area.

Disaster Peak

Area number:

OR-003-153/NV-020-859

Size (acres):

30,490 of which 30,195 were studied at the request of the U.S. Bureau of

Land Management.

Status of

mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S.

Geological Survey and the U.S. Bureau of Mines (Minor and others,

1988).

Identified mineral resources (known):

No mineral resources have been identified in the Wilderness Study Area. Small sand and gravel deposits do exist in the area, but the utilization

would be only for local construction.

In the vicinity of The Granites, southwest of Disaster Peak, are several prospect pits and the remains of two small mills. In 1986, several samples taken by the Bureau of Mines contained more than 0.1 ounce

gold per ton.

Mineral resource potential (undiscovered):

There is high and low potential for gold resources in quartz veins in the southern part and low potential for epithermal gold, silver, mercury, and uranium resources in the northeastern part of the study area. The study area has no potential for sand and gravel, oil and gas, or geothermal

energy resources.

Mining activity:

July 1989 BLM records show 142 mining claims in or adjacent to the area. No mining companies are currently involved in active exploration programs in this area. Amselco and McDermitt Mines abandoned their

exploration programs on claims in and adjacent to the area in 1987.

Mineral setting:

The southern part of the study area is underlain by Cretaceous granitic rocks. An approximately flat-lying sequence of Tertiary volcanic and pyroclastic flows unconformably onlaps the granitic rocks and is exposed within most of the remainder of the study area. The Long Ridge caldera, located just east of the study area, is a collapse structure resulting from the eruption of an ash-flow tuff that forms the top of the flow sequence. The caldera is filled largely by tuffaceous sedimentary rocks. Numerous arcuate, north- to northeast-striking caldera ring faults displace rocks in and near the northeastern part of the study area. Younger, north-northwest-striking normal faults that have large displacements cut rocks

west of the caldera in the study area.

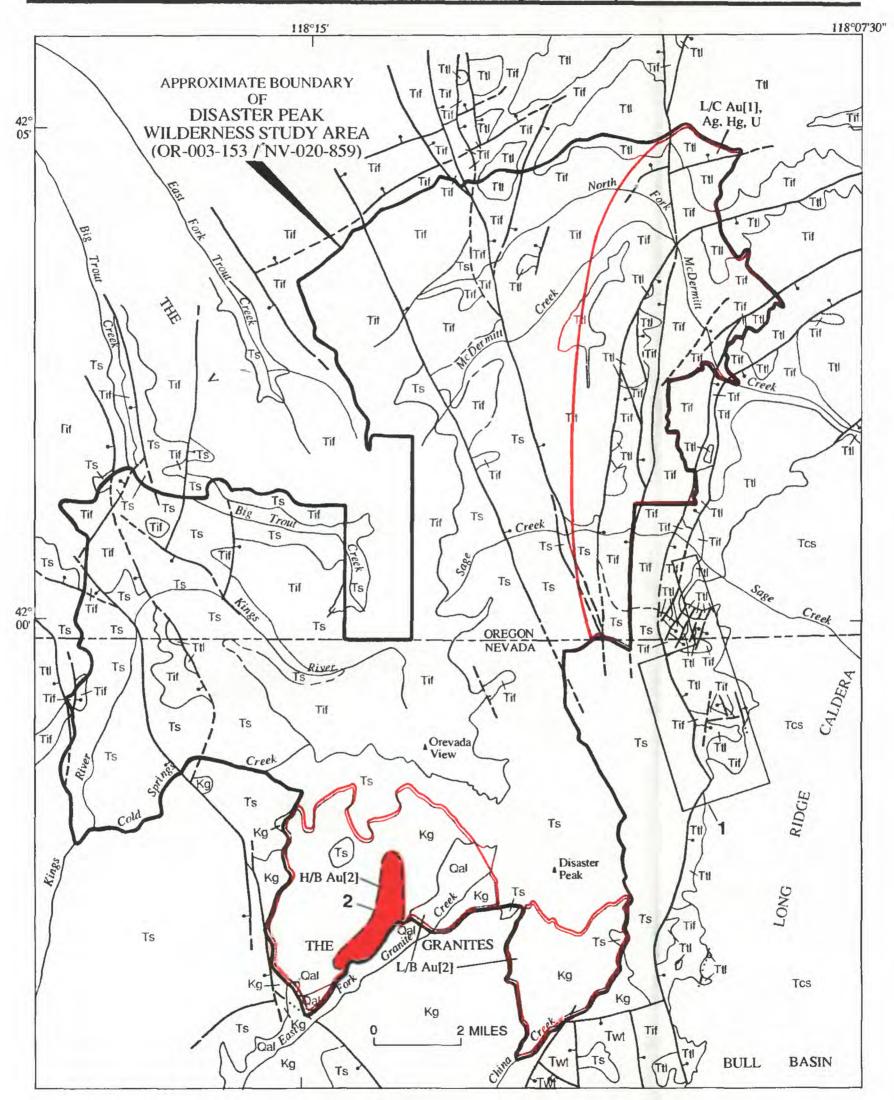
Recommendations:

Recent evaluations of this area indicate there may be some potential for the discovery gold resources on the southern and eastern boundaries.

More detailed examinations of the area are recommended.

References:

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Mineral resources of the Disaster Peak Wilderness Study Area.

	Area having high mineral resource potential (H)
	Area having low mineral resource potential (L)
	Level of certainty of assessment
B C	Data only suggest level of potential Data give good indication of level of potential
	Commodities
Au	Gold
Ag	Silver
Hg	Mercury
U	Uranium
[]	Type of deposit or occurrence
1	Epithermal
2	Quartz veins
	Prospects and claims—See table for description
1	Albisu prospect
2	Au claim group
	Geologic map units
Qal	Alluvium (Quaternary)
Tcs	Caldera-fill sedimentary rocks (Miocene)
Ttl	Tuff of Long Ridge and, locally, tuff of Trout Creek Mountains (Miocene)
Tif	Intermediate lava flows (Miocene)
Ts	Steens Basalt (Miocene)
Twt	Dacitic welded tuff (Eocene)
Kg	Granitic rocks (Cretaceous)
	Contact—Dashed where approximately
	located
	 Fault—Dashed where approximately located; dotted where concealed. Bar and ball on downthrown side

Explanation, mineral resources of the Disaster Peak Wilderness Study Area.

Area number:

Dry Valley Rim CA-020-615

Size (acres):

93,205 of which 54,480 were studied at the request of the U.S. Bureau of

Land Management.

Status of mineral surveys: Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Diggles and others,

1988a).

Identified mineral resources (known):

No metallic resources are identified. The Red Rock and Willow Springs areas contain 85 million tons of altered basalt containing amygdules that host an inferred subeconomic resource of zeolites. More than 50 percent of this basalt consists of amygdules filled with chabazite (a zeolite mineral).

The Broken Shovel claims, located along the southeast boundary of the study area, contain a 100,000-ton occurrence of perlite. While usable for lightweight aggregate, the deposit is too small for economic production. However, if considered for perlite production with other nearby deposits, this occurrence could become a subeconomic resource.

Montmorillonitic clays are present in alluvial sediment in the Capricorn claims adjacent to but outside the study area. Alluvial sediments contain more than 30 percent (volume) clays.

Mineral resource potential (undiscovered): Amygdule-rich basalt that crops out in the Red Rock Canyon and Willow Springs areas has moderate resource potential for zeolites. The areas of alteration that contain the zeolites are proximal to a north-trending fault that probably controlled the movements of alteration fluids. The quality of the zeolites around Red Rock Canyon and west of Willow Springs may be adequate for use as an absorbent in animal husbandry.

The area of silicic volcanic rocks around the Broken Shovel claims has low resource potential for perlite. The perlite is hosted in displaced blocks of what possibly originated as a rhyolite flow-dome complex.

Montmorillonitic clay is present in alluvial sediment east of Red Rock Canyon at the Capricorn claims area east of the study area. This material is not suitable as a pozzolan but may qualify as fuller's earth, which is used as absorbents and for bleaching oils. The clay occurrence, however, does not extend into the study area.

Mining activity:

The wilderness study area is not in a mining district and no mining activity has been recorded. There are no current mining claims in the wilderness study area according to October, 1988, U.S. Bureau of Land Management records.

Mineral setting:

The Dry Valley Rim Wilderness Study Area is underlain by a 17-mi-long, north-trending fault block. Rocks in the study area are mostly middle Miocene andesite, andesitic lahar deposits and basalt and include minor amounts of rhyolitic ash-flow tuff. The oldest rocks in the study area are andesite flows and lahar deposits, commonly intercalated with olivine basalt. Rhyolite ash-flow tuff and lithic tuff are exposed in the fault scarp of the central part of Dry Valley Rim stratigraphically above the andesite. The rhyolite tuff is locally zeolitic. Olivine basalt flows cap the western dip slope of the study area. The major structure in the study area is the normal fault scarp that forms Dry Valley Rim.

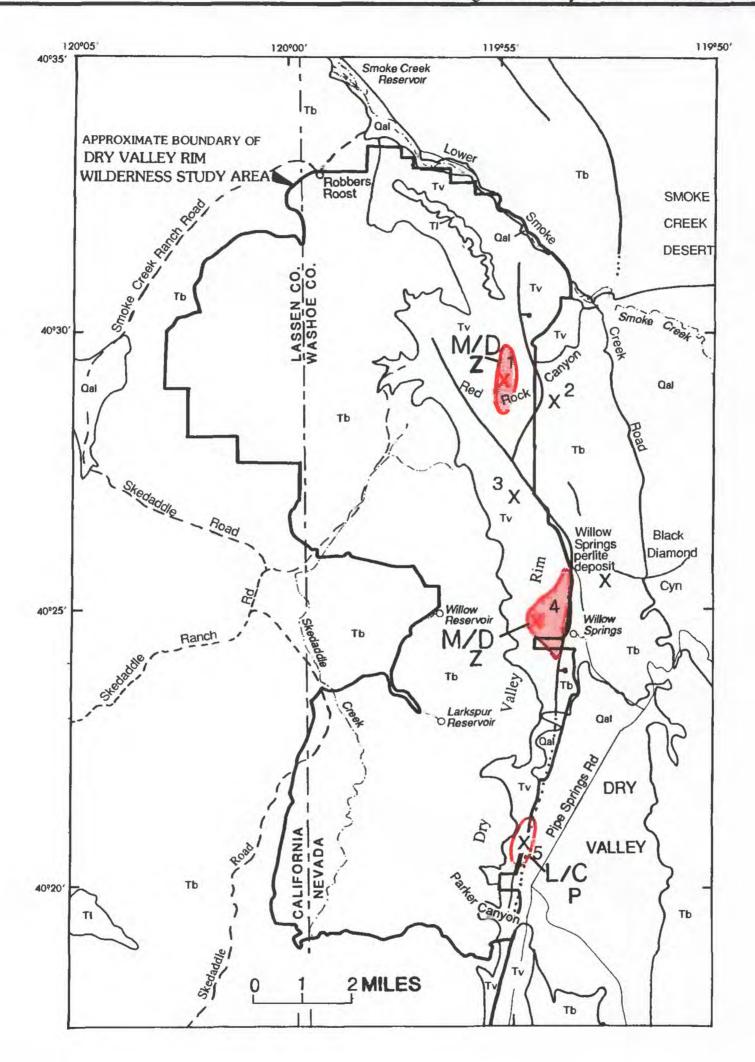
Recommendations:

As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 38,720 acres that constitute the balance.

References:

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- Diggles, M.F., Batatian, L.D., and Dellinger, D.A., 1986, Geologic map of the Dry Valley Rim Wilderness Study Area, Lassen County, California and Washoe County, Nevada: U.S. Geological Survey Open-File Report 86-83, scale, 1:48,000.
- Diggles, M.F., Dellinger, D.A., and Batatian, L.D., 1989, Geologic map of the Skedaddle Mountain Wilderness Study Area, Lassen County, California, and Washoe County, Nevada: U.S. Geological Survey Miscellaneous Field Studies Map MF-2006, scale 1:48,000.
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- Diggles, M.F., Frisken, J.G., Plouff, Donald, Munts, S.R., and Peters, T.J., 1988b, Mineral resources of the Skedaddle Mountain Wilderness Study Area, Lassen County, California, and Washoe County, Nevada: U.S. Geological Survey Bulletin 1706-C, 27 p.
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Mineral resources of the Dry Valley Rim Wilderness Study Area.

	Area with moderate mineral resource potential
	Area with low mineral resource potential
	See appendix for definition of levels of mineral resource potential (M,L) and certainty of assessment (C,D)
	Commodities
Z P	Zeolites Perlite
X	Prospect—Red symbol indicates identified resources
1 2 3 4 5	Red Rock zeolite Capricorn claims Rocky Springs zeolite Willow Springs zeolite Broken Shovel claims
	Correlation of map units
	Qal QUATERNARY
	Unconformity
	Tv TERTIARY
	Geologic map units
Qal	Alluvium (Quaternary)—Unconsolidated silt, sand, and grave deposited by fluvial processes; also includes colluvial aeolian, lacustrine, and landslide deposits
ТЬ	Basalt (Tertiary)—Olivine basalt flows consisting of fine grained to aphanitic or glassy rocks with phenocrysts of olivine (less than 1 mm), often altered to iddingsite or with
Τν	iddingsite rims Volcanic rocks (Tertiary)—Volcanic rocks consisting of intercal lated basalt, andesite, rhyolite ash-flow tuff, and lahar de posits. Basalt is locally zeolitic and rhyolite is locally perliti
π	Lahar deposits (Tertiary)—Volcanic debris flow and breccia Occurs as thick sequences of flows in northern part of stud area, elsewhere as lobate flows filling channels and a crusts on sides of channels. Contain poorly sorted, angula to sub-rounded clasts of basaltic, andesitic, and (or) daciti material, in a clast-supported matrix of fine lithic fragment and ash

Explanation, mineral resources of the Dry Valley Rim Wilderness Study Area.

Fault-Dotted where concealed; bar and ball on downthrown

Area number: Size (acres):

East Fork High Rock Canyon CA-020-914/NV-020-006A

52,639 of which 33,460 were studied at the request of the U.S. Bureau of

Land Management.

Status of mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Ach and others, 1987).



Identified mineral resources (known):

No mineral resources have been identified within the wilderness study area.

Mineral resource potential (undiscovered):

Two areas in the northern and eastern part of the study area have moderate mineral resource potential for gold, silver, and mercury in epithermal deposits. One area along the west boundary of the study area has moderate mineral resource potential for zeolite minerals. A low potential also exists for geothermal energy resources, and potential for oil and gas is unknown.

Mining activity: No mining districts are situated in or near the wilderness study area. There has been no known prospecting activity or mineral production from the wilderness study area, however one pit was found dug in barren rock. There are no current mining claims in the wilderness study area according to July 1989, U.S. Bureau of Land Management records.

Mineral setting:

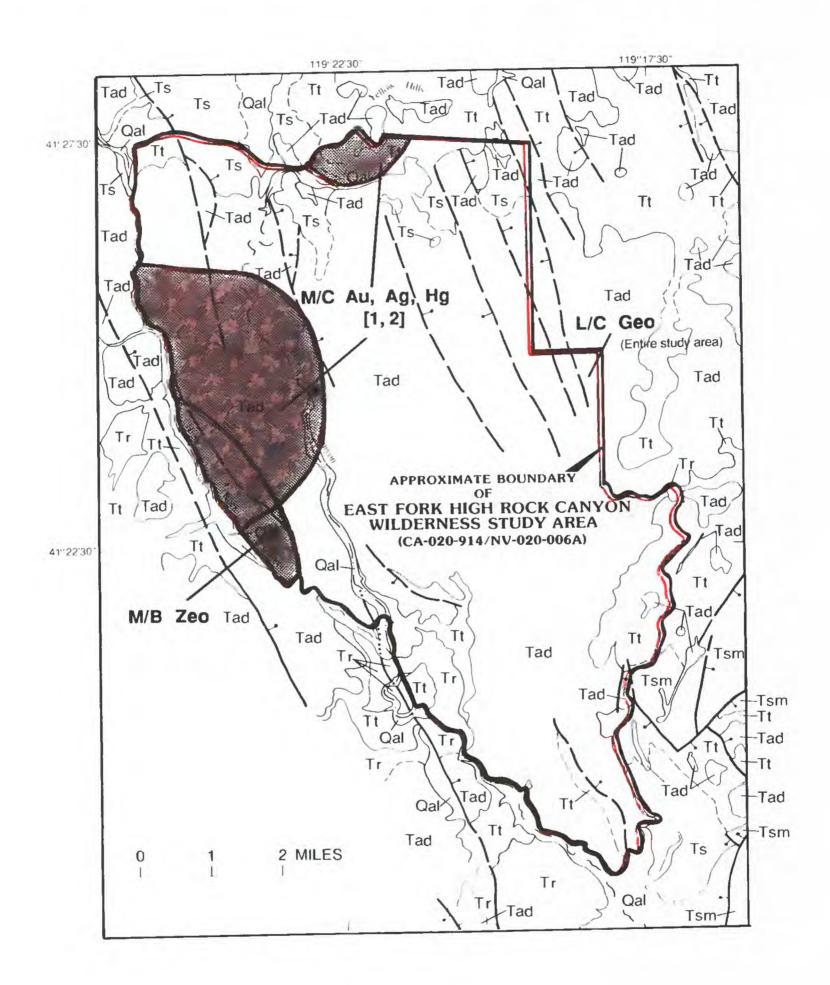
There are no pre-Miocene basement rocks exposed in the study area. The basement is assumed to be composed of granites and metamorphosed sedimentary rocks. If this is the case, there is no oil and gas resource potential. The oldest exposed rock unit is the middle Miocene Soldier Meadow Tuff. This tuff is overlain by a nonwelded air-fall tuff. The two tuffs have been intruded by rhyolite and are overlain by sedimentary rocks formed in lake-bottom settings. There are several dark basalt caps in the central part of the study area. Ring fractures formed during the eruption of the tuffs may have provided a "plumbing system" for orecarrying and zeolite-forming hydrothermal fluids in the past and may provide avenues for geothermal fluids now.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 19,179 acres that constitute the balance.

References:

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- Bonham, H.F., 1969, Geology and mineral deposits of Washoe and Storey Counties, Nevada, with a section on industrial rock and mineral deposits by K.G. Papke: Nevada Bureau of Mines Bulletin 70, 14 p.
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- Overton, T.D., 1947, Mineral resources of Douglas, Ormsby, and Washoe Counties, Nevada: Nevada University Bulletin, v. 41, no. 9, 46 p.
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Mineral resources of the East Fork High Rock Canyon Wilderness Study Area.

EXPLANATION

	Area with moderate mineral resource potential
	Area with low mineral resource potential
	pendix for definition of levels of mineral resource potential ertainty of assessment
	Commodities
Au	Gold
Ag	Silver
Hg	Mercury
Zeo	Zeolites
Geo	Geothermal
[]	Deposit types
1	Epithermal or hot-spring deposits of gold and silver in volcanic and volcaniclastic rocks
2	Epithermal mercury deposits in volcanic and volcaniclastic rocks
	Geologic map units
Qal	Alluvium (Quaternary)
Ts	Lacustrine sedimentary rocks (Tertiary)
Tad	Andesite to dacite flows and dikes (Tertiary)
Tr	Rhyolite flows, domes, and dikes (Tertiary)
Tt	Air-fall tuff (Tertiary)
Tsm	Soldier Meadow Tuff (Tertiary)
	Contact—Dashed where approximate
<u></u>	 Normal fault—Dashed where approximate, dotted where concealed; bar and ball on downthrown side
	- Intermittent stream

Explanation, mineral resources of the East Fork High Rock Canyon Wilderness Study Area.

El Dorado Area number: NV-050-423

Size (acres):

12,290

Status of

This wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Conrad mineral surveys:

and others, 1990).

Identified mineral resources (known):

There are inferred subeconomic resources of gold and silver on the Paul and Bel claims; inferred subeconomic resources of silver, lead, and zinc on the Big Horn claims; and inferred subeconomic resource of gold, silver, copper, lead, and zinc on the Montezuma patented claims; all on the southern and southeastern part of the WSA (Causey and Miller, 1988). The study area also contains sand and gravel resources useful for local road construction.

Mineral resource potential (undiscovered): There is high potential for gold, silver, copper, lead, zinc, and mercury in the southeastern part of the study area. Moderate potential for these metals exists throughout the rest of the study area. A uranium occurrence reported by Garside (1973) suggests that there is low resource potential for uranium in Precambrian rocks exposed in the southeastern part of the study area. The study area has low potential for cobalt, nickel, tungsten and molybdenum. Sand and gravel occur mostly in small deposits suitable for local use; there is low potential for significant resources of these commodities. There is no potential for oil and gas resources.

Mining activity: The WSA is on the edge of the Eldorado mining district. It includes parts of two separate patented claim groups (Montezuma - MS 3966 and Techatticup Consolidated - MS 3973 A and B). No production of gold, silver, copper, lead, zinc, or mercury has come from the WSA, but at least \$6 million worth of these metals has been recovered from mines nearby. Unrecorded amounts of sand and gravel have been mined for road metal from the WSA.

Recent exploration has been done by Exxon, Placer Amex, and Homestake. Mill tailings from the Techatticup Mill were leached by Canyon Mining Company in 1988. Nine claim groups in the WSA were examined by Causey and Miller (1988). Activity was minimal with five of the groups being abandoned.

July 1989 BLM records show 80 lode and 19 placer claims in the WSA.

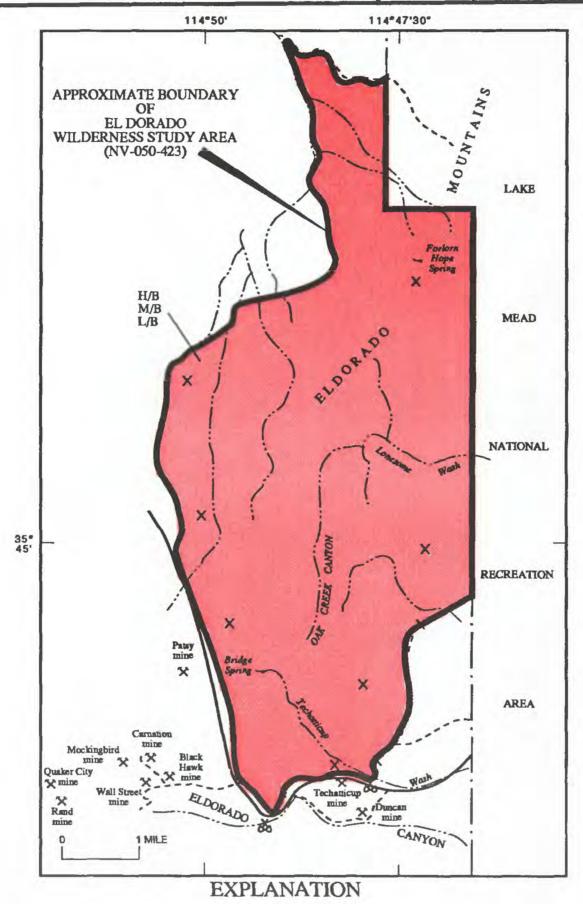
Mineral setting:

The El Dorado area is underlain by Miocene volcanic rocks faulted against Precambrian gneiss and schist. These rocks are intruded by granitic rocks along the south boundary of the area. The rocks are cut by numerous north-trending faults. Dikes of varying composition also cut the rocks and have intruded along faults.

Recommendations: No further work is recommended.

References:

- Causey, J.D., and Miller, M.S., 1988, Mineral resources of the El Dorado study area, Clark County, Nevada: U.S. Bureau of Mines Open File Report MLA 44-88, 48 p.
- Conrad, J.E., Nowlan, G.A., and Causey, J.D., 1990, Mineral resources of the El Dorado and Ireteba Peaks Wilderness Study Areas, Clark County, Nevada: U.S. Geological Survey Open-File Report
- Garside, L.J., 1973, Radioactive mineral occurrences in Nevada: Nevada Bureau of Mines and Geology Bulletin 81, 121 p.
- Great Basin GEM Joint Venture, 1983, Eldorado Mountains G-E-M resources area (GRA no. NV-37) technical report (WSA's NV-050-0423 and 050-0438): Prepared for the U.S. Bureau of Land Management, contract YA-554-RFP2-1054, 33 p.
- Hansen, S.M., 1962, The geology of the Eldorado mining district, Clark County, Nevada: University of Missouri Ph.D. dissertation, 262 p.
- Hewett, D.F., Callaghan, Eugene, Moore, B.N., Nolan, T.B., Rubey, W. W., and Schaller, W.T., 1936, Mineral resources of the region around Boulder Dam: U.S. Geological Survey Bulletin 871, 197 p.
- Longwell, C.R., Pampeyan, E.H., Bowyer, Ben, and Roberts, R.J., 1965, Geology and mineral deposits of Clark County, Nevada: Nevada Bureau of Mines and Geology Bulletin 62, 218 p.
- Smith, P.L., and Tingley, J.V., 1983, A mineral inventory of the Esmeralda-Stateline Resource Area, Las Vegas District, Nevada: Nevada Bureau of Mines and Geology Open-file Report 83-11, 173 p.
- Vanderburg, W.O., 1937, Reconnaissance of mining districts in Clark County, Nevada: U.S. Bureau of Mines Information Circular 6964, 81 p.



- H/B Geologic terrane having high mineral resource potential for gold, silver, copper, lead, zinc, and mercury with certainty level B
- M/B Geologic terrane having moderate minral resource potential for gold, silver, copper, lead, zinc, and mercury with certainty level B
- L/B Geologic terrane having low mineral resource potential for gold, silver, copper, lead, zinc, mercury, uranium, cobalt, nickel, tungsten, molybdenum, and sand and gravel with certainty level B

Mineral resources of the El Dorado Wilderness Study Area.

Evergreen

Area number:

NV-050-1R-16A/B/C

Size (acres):

2,694

Status of

This area was not studied by the U.S. Bureau of Mines or the U.S. mineral surveys:

Geological Survey.

Identified mineral resources (known):

No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential (undiscovered): There is no indication of metallic mineral resource potential in the area. It is almost entirely covered by alluvium similar to that that covers hundreds of thousands of acres in this part of Nevada. There is low potential for sand and gravel in the area. Depth to bedrock with potential for metallic

resources is unknown but probably great.

Mining activity: July 1989 BLM mining claim records do not show any claims in or near the WSA. There is no known current exploration activity. The nearest

claims are about eight miles away.

Mineral setting:

The area is underlain primarily by Quaternary unconsolidated alluvium. However, Tertiary tuffs and undifferentiated volcanics occur in the northern end of the study area and are similar to those in the Delamar mining district. There is probably older Tertiary age alluvium at some

depth and Paleozoic dolomite at greater, but unknown, depth.

Recommendations: Surface seismic reflection studies might reveal important data about depth to bedrock and other near surface structural features. The Wilderness Study Area should be studied as part of a comprehensive mineral survey

by the U.S. Bureau of Mines and the U.S. Geological Survey.

References:

Barton, H.N., and Day, W.D., 1984, Reconnaissance geochemistry of the Delamar Mountains Bureau of Land Management Wilderness Study Area (NV 050-0177), Lincoln County, Nevada: U. S.

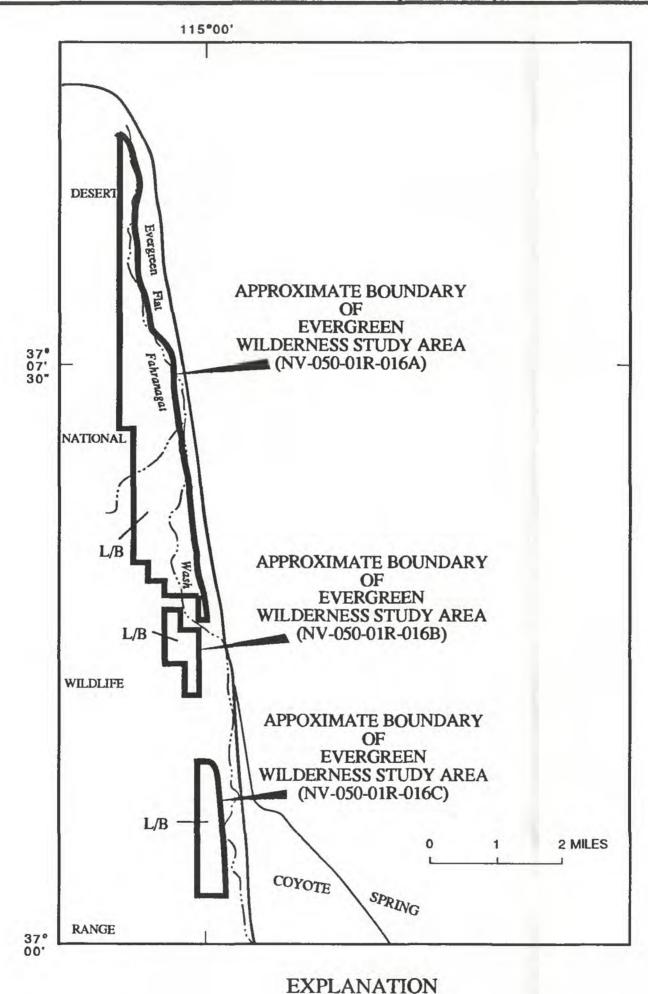
Geological Survey Open File Report 84-360.

Bureau of Land Management, 1979, Initial inventory decisions Public Lands administered by BLM Nevada: U.S. Department of the Interior, Bureau of Land Management, p. 306.

Callaghan, Eugene, 1937, Geology of the Delamar District, Lincoln County, Nevada: Nevada University Bulletin v. 31, no. 5, 69 p.

Elevatorski, E.A., 1981, Disseminated/Replacement gold deposits: Minobras, p. 56.

- Great Basin GEM Joint Venture, 1983, Delamar Mountains/Evergreen G-E-M Resources Area (GRA NO. NV-25) Technical Report (WSA NV 050-177, 050-01R-16A, 050-01R16-B, and 050-01R016C), 38 p.
- Tschanz, C.M., and Pampeyan, E.H., 1961, Preliminary Geologic Map of Lincoln County, Nevada: U.S. Geological Survey Mineral Investigations Field Studies Map MF-206.



L/B Geologic terrane having low mineral resource potential for sand and gravel with certainty level B

Mineral resources of the Evergreen Wilderness Study Area.

Fandango NV-060-190

Area number: Size (acres):

40,940 of which 31,740 were studied at the request of the U.S. Bureau of

Land Management.

Status of

mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of

Mines (John and others, 1987).

Identified mineral resources (known):

A small (200 tons of ore) zinc-lead-silver resource (Lead Pipe property, No. 1 on fig.) exists in the northeastern part of the study area. A disseminated gold occurrence associated with a jasperoid thrust breccia in the northeastern part of the study area (old CL claim group) was explored

during 1983-86, but the occurrence was deemed uneconomic.

Mineral resource potential (undiscovered):

The Fandango Wilderness Study Area has several areas of high potential for gold resources, and several small areas of low and moderate potential for silver, lead, and zinc resources. In addition, there is low potential for

petroleum, natural gas, uranium, and geothermal energy.

Mining activity:

There are no patented claims inside the study area and as of 7/89 there are also no unpatented claims on file with the BLM. The only reported production in the study area came from the Lead Pipe property where some high-grade lead ore was produced during WW 1. The lead Pipe property has three adits that were driven into slightly silicified carbonate rock at three different levels. During 1983-86, Long Lac Mineral Exploration, Inc., Reno, NV, explored the northeastern part of the study area for a disseminated gold deposit (Carlin-type). The initial exploration identified three areas with potential mineral resources of barium-zinc-lead-silver, zinc-lead-silver, and low-grade, large-tonnage gold and anomalous molybdenum. As of 3/89, the company had dropped the claim group because the primary target, the gold deposit, was determined to be uneconomic.

Mineral setting:

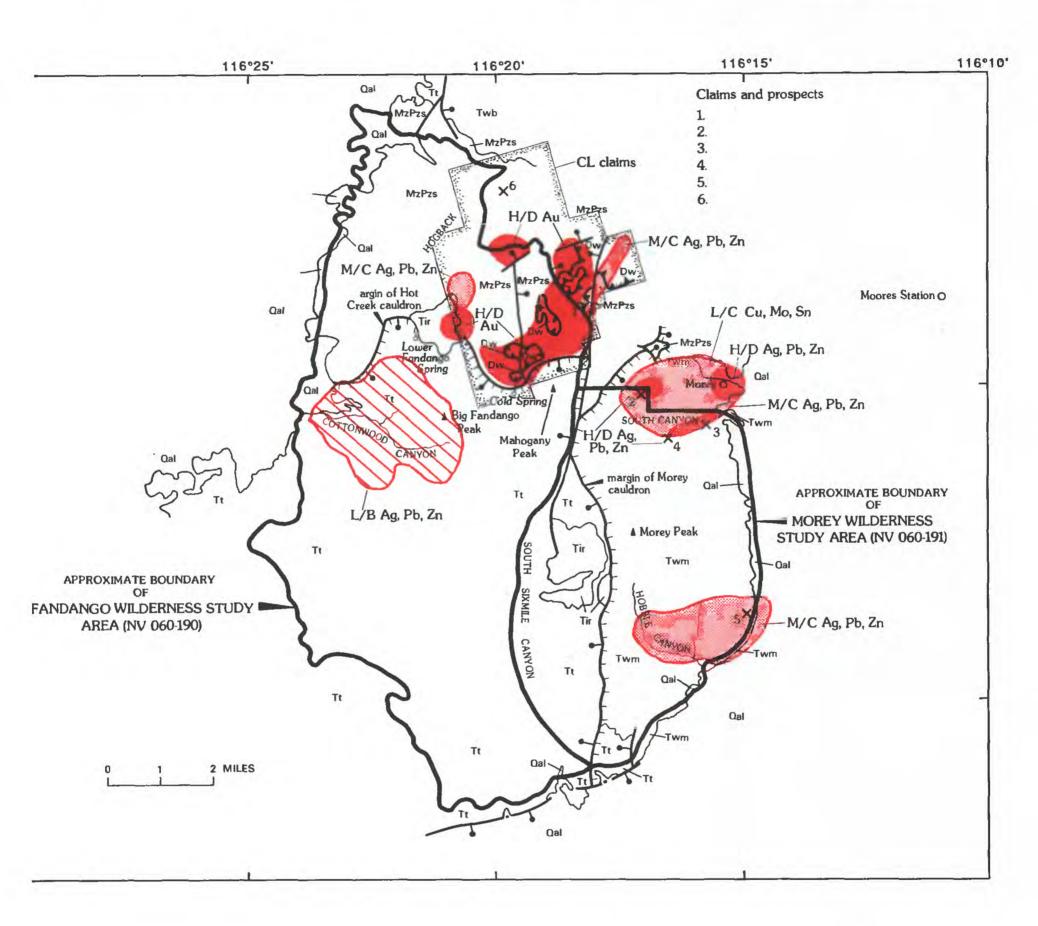
The northern part of the Fandango Wilderness Study Area is underlain by Paloezoic and Mesozoic sedimentary rocks. Most of the sedimentary rocks are carbonate rocks, with minor quartzite, calcareous shale, siliceous shale, and siltstone. The southern part of the study area is underlain by middle Tertiary silicic volcanic rocks that are mainly ashflow tuffs. Several ages and types of faults are present in the study area, including Mesozoic thrust faults and Cenozoic high-angle normal faults. The intersections of thrusts and high-angle normal faults served as important controls on localization of hydrothermal alteration and gold mineralization in the study area.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 9,200 acres that constitute the balance. Continued attention should be given to the northeastern part of the study area because improvements in mineral technology and/or metal prices could again make the area a development target.

References:

John, D.A., Nash, J.T., Plouff, Donald, and McDonnell, J.R., Jr., 1987, Mineral resources of the Morey and Fandango Wilderness Study Areas, Nye County, Nevada: U.S. Geological Survey Bulletin 1731-A, 19 p.

McDonnell, J.R., Jr., 1985, Mineral investigation of the Fandango (NV-060-190) and Morey (NV-060-191) Wilderness Study Areas, Nye County, Nevada: U.S. Bureau of Mines Open-File Report 61-85, 41 p.



Mineral resources of the Fandango Wilderness Study Area.

EXPLANATION



AREA WITH HIGH MINERAL RESOURCE POTENTIAL—Commodities as shown. See appendix 1 and figure 3 for definition of mineral resource potential and certainty of assessment



AREA WITH MODERATE MINERAL RESOURCE POTENTIAL-Commodities as shown



AREA WITH LOW MINERAL RESOURCE POTENTIAL-Commodities as shown

×1 Prospect with identified mineral resource

COMMODITIES

Au Gold

Ag Silver

Cu Copper

Mo Molybdenum

Pb Lead

Sn Tin

Zn Zinc

DESCRIPTION OF MAP UNITS

Qal ALLUVIUM (QUATERNARY)

Tir INTRUSIVE RHYOLITE (TERTIARY)

Tt ASH-FLOW TUFFS (TERTIARY)

Twb WINDOUS BUTTE FORMATION (TERTIARY)

Twm TUFF OF WILLIAMS RIDGE AND MOREY PEAK (TERTIARY)

MzPzs SEDIMENTARY ROCKS (MESOZOIC AND PALEOZOIC)
Dw WOODRUFF (?) FORMATION (DEVONIAN)

MAP SYMBOLS

----- CONTACT

THRUST FAULT-Sawteeth on upper plate

CAULDRON MARGIN-Approximately located

APPROXIMATE BOUNDARY of ACTIVE CLAIMS

×4 PROSPECT OR CLAIM

Far South Egans NV-040-172

Area number: Size (acres):

53,224 of which 42,316 were studied at the request of the U.S. Bureau of

Land Management.

Status of mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of

Mines (Hedlund and others, 1987).

Identified mineral resources (known):

No metallic-mineral resources or occurrences are known within the Far South Egans Wilderness Study Area. Industrial-mineral commodities such as carbonate rocks, high-silica quartzite, sand and gravel deposits, and perlite are present within and near the study area, but these area common materials of low unit value and generally require local markets to be economically exploited.

Mineral resource potential (undiscovered): The northeastern part of the Far South Egans study area has moderate mineral resource potential for gold and molybdenum related to Tertiary intrusive or volcanic rocks. Moderate potential for cadmium, molybdenum, lead, and zinc exists in the southern part of the study area related to a faulted jasperoid vein. The rest of the study area has low potential for all metals. The energy resource potential for oil, gas, and coal within the study area is low, based on the exposed rock units. The adjacent basins, such as the White River and Cave Valleys, have a moderate potential for oil and gas reservoir rocks in the subsurface (Sandberg, 1983). If the surface rocks in the study area have been thrust over these more favorable source rocks, the resource potential for oil and gas may be higher; however, because the underlying rocks are unknown, the potential for oil and gas in the underlying rocks is classed as unknown.

Mining activity: There are no mining districts, mines, prospects, or current mining claims in the study area. On the south side of Trough Spring Canyon (south of the study area), two prospect pits expose a vein along a northeast-striking fault.

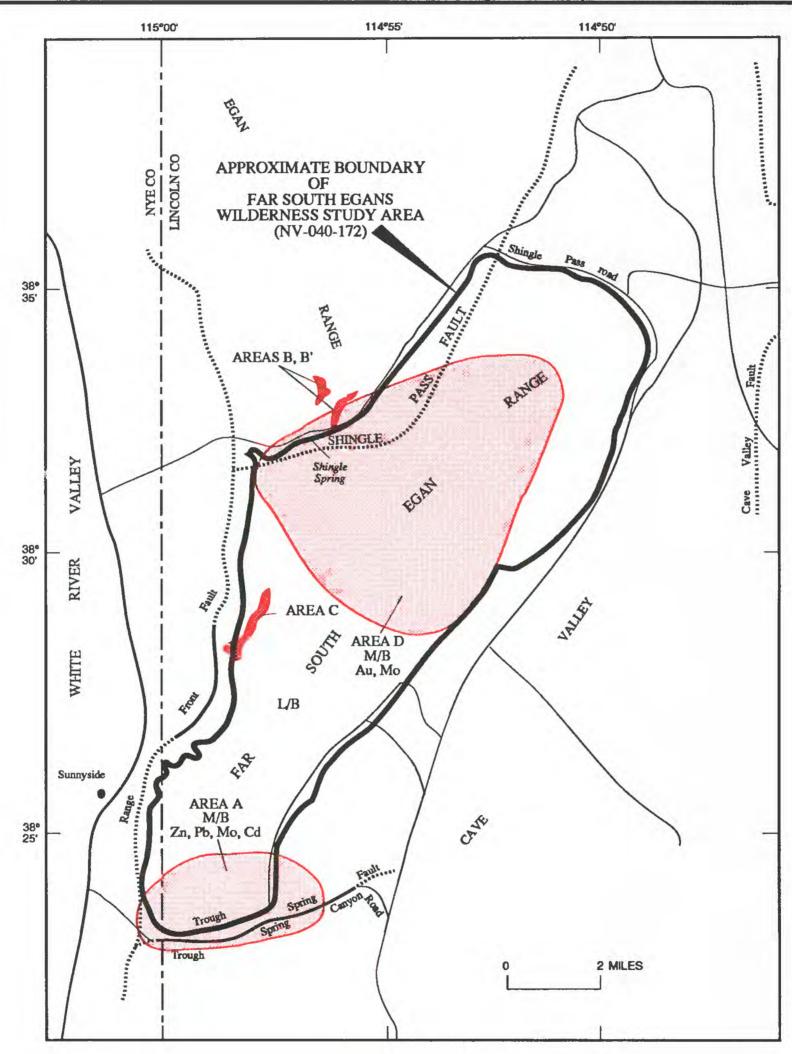
Mineral setting:

The Egan Range consists of a coextensive series of eastward-tilted fault blocks. Within the study area, as much as 19,000 ft of tilted Paleozoic (see geologic time chart on the last page of this report) strata are locally overlain by both tilted and flat-lying mid- and early Tertiary volcanic rocks. The structural features of the study area are controlled by the Shingle Pass fault to the north, by the Trough Spring fault on the south, and by a major range-front fault largely concealed by piedmont-slope fan deposits along the eastern margin of White River Valley. Pleistocene lacustrine deposits younger than the Cave Valley Formation fill Cave Valley on the east.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 10,908 acres that constitute the balance.

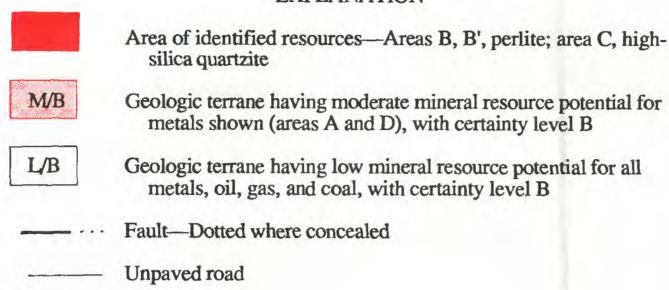
References:

Hedlund, D.C., Davies, R.C., Hovorka, D.S., Blank, H.R., Jr., and Tuftin, S.E., 1987, Mineral resources of the Far South Egans Wilderness Study Area, Lincoln and Nye Counties, Nevada: U.S. Geological Survey Bulletin 1728-C, 11 pages.



Mineral resources of the Far South Egans Wilderness Study Area.

EXPLANATION



Area number: Size (acres): Fish & Wildlife #1/2/3 NV-050-201/216/217

50,334

Status of mineral surveys:

This area was not studied by the U.S. Bureau of Mines or the U.S. Geological Survey.

Identified mineral resources (known):

Along Highway 93, at least three sand and gravel pits in the study area and three adjacent to the east have been mined; three or more unmined sand and gravel material sites have been designated by the U.S. Bureau of Land Management in and near the study area. Arthur Henderson, part owner of Las Vegas Building Materials and Rock Products Limited reported (telephone conversation, 1989) that uncommon varieties (specific gravity, purity, and potential uses) of sand and gravel near the south end of the study area on the Newt Crumley and Mary Eleanor claim groups had exceptional properties for golf course sands and ballast. Mineral resources, especially sand and gravel for construction, probably will have an expanding market in the Las Vegas area.

Mineral resource potential (undiscovered):

There are no known metallic or nonmetallic resources known to occur within any of the three areas, and there are no indications that there are any undiscovered resources. Limestone and sand and gravel in the areas may be useable, but these commodities are abundant in the region. There is low potential for significant resources of these commodities. There are no known oil and gas leases in any of the three areas, although the potential for petroleum is deemed by Sandberg (1983) to be moderate in the three areas. Muffler (1979) shows no evidence of potential for geothermal resources in any of the areas.

Mining activity:

The Lead King Mine, in the southeast of section 6, T. 19 S., R. 63 E., about two miles south of the study area, produced two railroad carloads of ore containing 59 percent lead in galena and cerrussite from a shear zone 1 foot to 4 feet thick in Monte Cristo Limestone (Longwell and others, 1965, p. 180).

High-calcium limestone and lime are being produced about three miles east of the south end of the study area. Limestone has been mined in this vicinity for decades; approximately 500,000 tons of limestone were being mined from the Crystal Pass Member of the Sultan Limestone near the study area in the 1930's (Longwell and others, 1965, p. 205).

July 1989 BLM records show one lode mining claim, an associated millsite location, and 98 placer mining claim locations were active in the WSA. Topographic maps showed one prospect pit in foothills near the south end of the study area.

In 1983, federal oil and gas leases covered most of the study area (Great Basin GEM Joint Venture, 1983).

Mineral setting:

The geology of the study area consists of a section of Paleozoic (Devonian through Permian) sedimentary stratified rocks. The dominant rock types in the area are limestone and dolomite of the Sultan, Monte Cristo, and Bird Spring formations. Interbedded in within these units are lesser amounts of sandstone, shale, and chert. At the north end of area No. 1, there are Tertiary tuffaceous sediments and tuff. Most of the total area of the three tracts is covered with alluvium and colluvium.

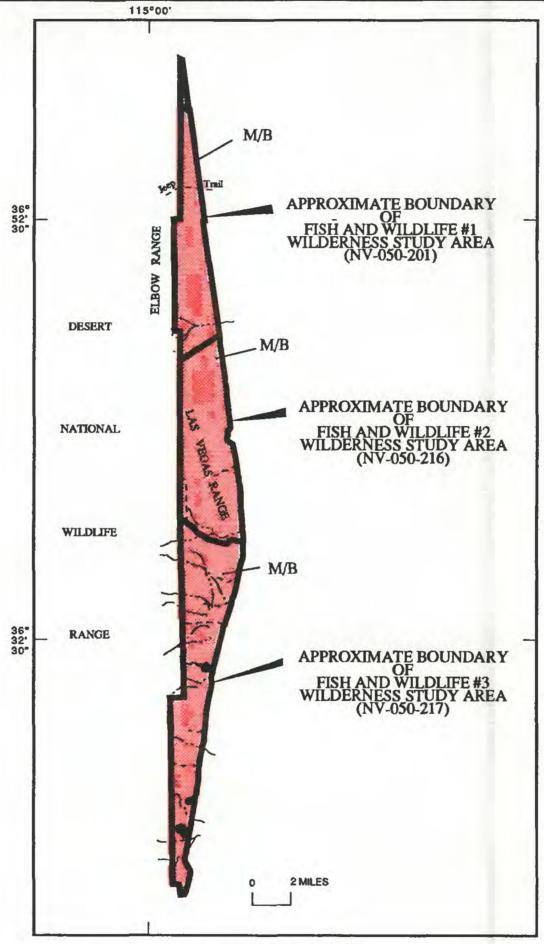
Recommendations:

Market studies and technical data for limestone, dolostone, and sand and gravel in the study area should be developed. Thorium in small, uneconomic amounts in sediments near the north end of the study area should be evaluated both as a placer source and as a guide to lode deposits. Likewise, other heavy elements, such as chromium, cobalt, and antimony occur in small, uneconomic amounts in sediments near the north and south end of the study area and should be evaluated as guides to lode deposits (see Qualheim, 1978; Cook and Fay, 1982). Broad aeromagnetic anomalies (see Aero Service Division, 1979) in the vicinity of the study area may be pertinent to oil and gas exploration and should be part of a mineral resource evaluation. The Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey.

References:

- Aero Service Division, 1979, Airborne Gamma-Ray Spectrometer and magnetometer survey, Las Vegas Quadrangle (Arizona, California, Nevada), Williams Quadrangle (Arizona), Prescott Quadrangle (Arizona), and Kingman Quadrangle (Arizona, California, Nevada), Final Report, volumes I and II: Houston, Tx, Western Geophysical Company of America, for U.S. Department of Energy, Open-File report GJBX 59(79).
- Bowyer, Ben, Pampeyan, E.H., and Longwell, C.R., 1958, Geologic map of Clark County, Nevada: U.S. Geological Survey Miscellaneous Field Investigations Map MF-138, scale 1:200,000.
- Bureau of Land Management, 1988, Draft environmental impact statement, Preliminary wilderness recommendations for Nevada contiguous lands: Department of Interior, Bureau of Land Management, Ely, Las Vegas, and Winnemucca Districts, 291 p, unpaginated section of maps.
- Cook, J.R., and Fay, W.M., 1982, Data report: western United States, National Uranium Resource Evaluation Program, hydrogeochemical and stream sediment reconnaissance: Aiken, SC, E.I. du Pont de Nemours and Company, Savannah River Laboratory, for U.S. Department of Energy, Open-File report GJBX 132(82), 33 p.
- Ekren, E.B., Orkild, Paul, Sargent, K.A., and Dixon, G.L., 1977, Geologic map of Tertiary rocks, Lincoln County, Nevada: U.S. Geological Survey Miscellaneous Field Investigations Map I-1041, scale 1:250,000.

- Great Basin GEM Joint Venture, 1983, Arrow Canyon/Las Vegas Range G-E-M Resources Area (GRA NO. NV-29) Technical Report (WSA's NV 050-0215, 050-0216, and 050-0217): Reno, Nevada, Great Basin GEM Joint Venture, Open-File report for U.S. Bureau of Land Management, 34 p.
- Longwell, C.R., Pampeyan, E.H., Bowyer, Ben, and Roberts, R.J., 1965, Geology and mineral deposits of Clark County, Nevada: Nevada Bureau of Mines, Bulletin 62, 218 p.
- Muffler, L.J.P., ed., 1979, Assessment of geothermal resources of the United States--1978: U.S. Geological Survey Circular 790, 163 p., maps in separate case.
- Nevada Mining Association, 1988, Nevada BLM wilderness study areas mineral potential handbook: Nevada Mining Association, One East First Street, Reno, NV.
- Qualheim, B.J., 1978, Hydrogeochemical and stream sediment reconnaissance basic data report for Las Vegas NTMS Quadrangle, Arizona, California, and Nevada: Livermore, CA, Lawrence Livermore Laboratory, for U.S. Department of Energy, Open-File report GJBX-123(78), 42 p. plus two appendixes.
- Sandberg, C.A., 1983, Petroleum potential of wilderness lands in Nevada: U.S. Geological Survey Circular 902-H, 11 p.
- Tschanz, C.M., and Pampeyan, E.H., 1970, Geology and mineral deposits of Lincoln County, Nevada: Nevada Bureau of Mines Bulletin 73, 187 p.



EXPLANATION

M/B Geologic terrane having moderate mineral resource potential for oil and gas with certainty level B

L/B Geologic terrane having low mineral resource potential for sand and gravel, and limestone with certainty level B

Mineral resources of the Fish and Wildlife #1/2/3 Wilderness Study Areas.

Area number: Size (acres): Five Springs CA-020-609 49,206

Status of

mineral surveys:

This area was not studied by the U.S. Geological Survey or the

U.S. Bureau of Mines.

Identified mineral resources (known):

The only known mineral commodity in the wilderness study area is about 2,000,000 tons of clay at the Hillside deposit in the Stoney Creek drainage in T. 31 N., R. 16 E., Sec. 3. The deposit was investigated and rejected as a potential source of aluminum in 1944. No records of investigations of other potential uses of the clay are known.

Mineral resource potential

(undiscovered):

There is high mineral resource potential for clay and low mineral resource potential for diatomite deposits in the wilderness study area. The area probably does not contain any metallic mineral commodities and is also unlikely to have geothermal energy resources.

Mining activity:

The wilderness study area is not in a mining district, contains no current claims or leases, according to 1988 U.S. Bureau of Land Management records, and has had no known mineral production.

Mineral setting:

The area is underlain by late Tertiary and minor Quaternary basaltic rocks with some Tertiary Lake bed deposits and Quaternary alluvium in the southern part of the area.

Recommendations:

The type, quality, and potential uses for the clay from the Hillside deposit should be investigated as part of a comprehensive mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines. References used (see below) did not indicate whether the lake beds might contain diatomite. A further literature search would probably provide this information. If indicated in the literature, field work to determine the extent and quality of diatomite might be warranted.

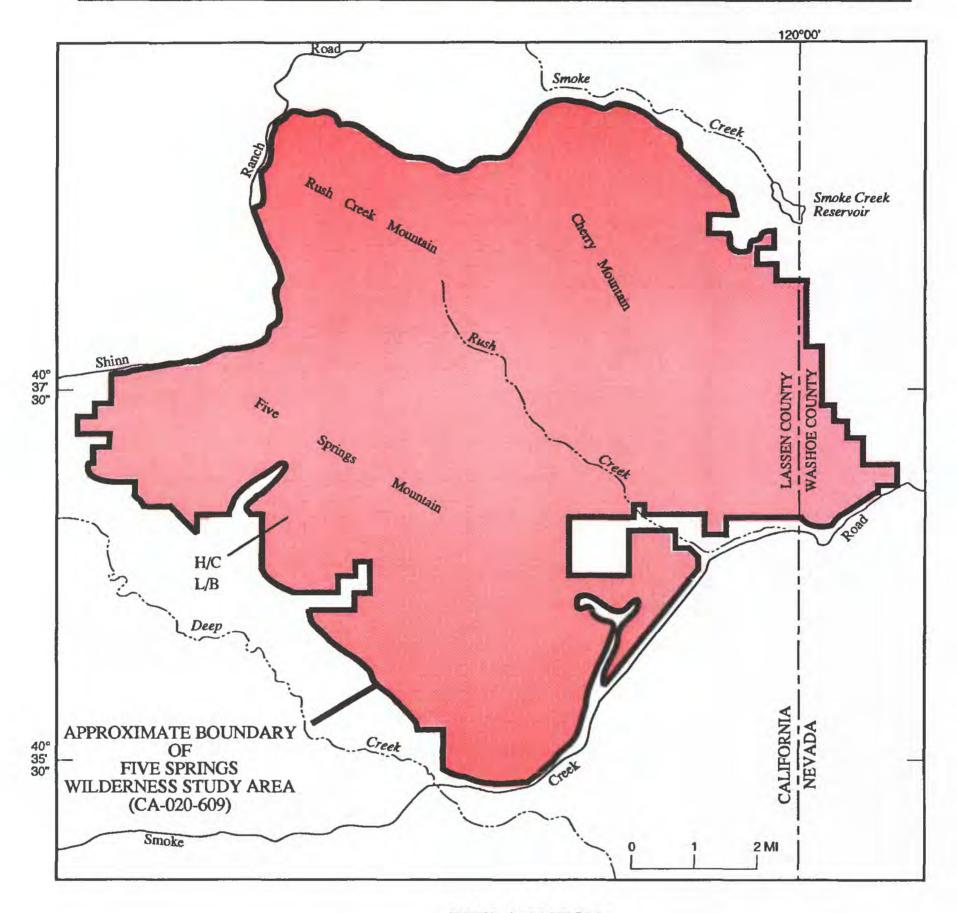
References:

- Gay, T.E., 1966, Economic mineral deposits of the Cascade Range, Modoc Plateau, and Great Basin region of northeastern California in Geology of northern California: California Division of Mines and Geology Bulletin 190, p. 104-107.
- Lydon, P.A., Gay, T.E., Jr., and Jennings, C.W., compilers, 1960, Westwood (Susanville) sheet: California Division of Mines and Geology Geologic Map of California, scale 1:250,000.
- U.S. Bureau of Land Management, 1984, Preliminary wilderness recommendations, Eagle Lake-Cedarville study areas: U.S. Bureau of Land Management Draft Environmental Impact Statement.

_____1988, Geographic index (of) all claims.

U.S. Bureau of Mines, 1989, Mineral property file (006-035-0121) on the Hillside clay deposit: Available at the U.S. Bureau of Mines, Western Field Operations Center, E. 360 Third Avenue, Spokane, WA 99202.

_____1989, Mineral Industry Location System (MILS).



EXPLANATION

H/C Geologic terrane having high mineral resource potential for clay with certainty level B

L/B Geologic terrane having low mineral resource potential for diatomite with certainty level B

Mineral resources of the Five Springs Wilderness Study Area.

Fortification Range

Area number:

NV-040-177

Size (acres):

mineral surveys:

41,615

Status of

This area was not studied by the U.S. Bureau of Mines or the U.S.

Geological Survey.

Identified mineral resources (known):

No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential (undiscovered): The mineral resource potential of the area is largely unknown. Ash-flow tuff and tuffaceous sedimentary rocks suggest that a low resource potential for perlite, epithermal gold-silver deposits and perhaps diatomite may be present. The underlying, and largely unexposed sequence of Paleozoic rocks suggests that there is low potential for oil and gas as source and reservoir rocks may be present.

Mining activity:

The Spring Valley Mine lies about one mile east of the WSA. One mining claim has been recorded within the WSA, but is not currently (July 1989) active. Six oil and gas leases cover 31,873 acres in the area.

Mineral setting:

Dominantly gently dipping tuffaceous sedimentary rocks and ash-flow tuff rest unconformably on Paleozoic limestone and shale. The name Fortification Range is derived from the high cliffs of erosion-resistant ash-flow tuff. Several north-south trending normal faults slice the range into narrow bands. The detailed geology of the range is little known.

Recommendations: Because so little is know about the resource potential of the area, and since the geology suggests that mineral resources may exist, this area should be studied as part of a comprehensive mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines.

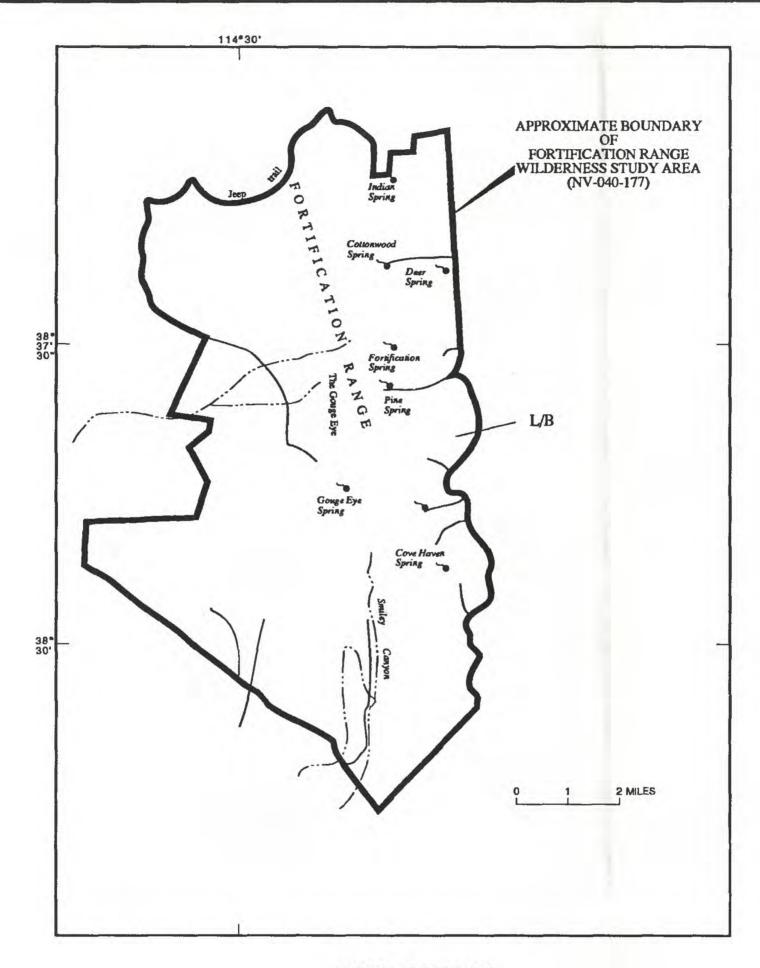
References:

Best, M.G., Christiansen, E.H., and Blank, R.H., 1989, Oligocene caldera complex and calc-alkaline tuffs and lavas of the Indian Peak volcanic field, Nevada and Utah: Geological Society of America Bulletin, v. 101, no. 8, p. 1076–1090.

Great Basin GEM Joint Venture, 1983, Fortification Range (WSA NV-040-177) G-E-M Resources Area: Technical report prepared for the U.S. Bureau of Land Management (contract YA-553-RFP2-1054), GRA No. NV-15, 25 p.

Nevada Mining Association, 1988, Nevada BLM Wilderness Study Areas, Mineral Potential Handbook: Reno, Nevada, unnumbered pages.

- Toth, M.I., Stoneman, R.G., Blank, H.R., Jr., and Gese, D.D., 1986, Mineral resources of the White Rock Range Wilderness Study Area, Lincoln County, Nevada, and Beaver and Iron Counties, Utah, Chapter B: U.S. Geological Survey Bulletin 1728-B, 14 p.
- Toth, M.I., Stoneman, R.G., Blank, H.R., Jr., and Gese, D.D., 1987, Mineral resources of the Parsnip Peak Wilderness Study Area, Lincoln County, Nevada, Chapter D: U.S. Geological Survey Bulletin 1728-D, 13 p.
- Tschanz, C.M., and Pampeyan, E.H., 1970, Geology and mineral deposits of Lincoln County, Nevada: Nevada Bureau of Mines and Geology Bulletin 73, 187 p.



EXPLANATION

L/B Geologic terrane having low mineral resource potential for perlite, gold, silver, diatomite, and oil and gas with certainty level B

Mineral resources of the Fortification Range Wilderness Study Area.

Fox Mountain Range

Area number: Size (acres):

NV-020-014 75,404

Status of

mineral surveys:

This area has not been studied by the U.S. Bureau of Mines or the U.S.

Geological Survey.

Identified

No mineral resources have been identified in the Wilderness Study Area.

mineral resources (known):

Extensive areas of rock and sand and gravel occur within the WSA. However, the distance to markets combined with the abundance of these commodities in the region prevent these materials from being classified as

identified resources.

Mineral resource potential (undiscovered): The Fox Mountain Range has a moderate potential for gold-silver quartzvein deposits along faults zones and dikes in metasedimentary and granitic rocks, a moderate potential for tungsten skarn deposits in metamorphosed limestone near granitic contacts, a low potential for leadsilver quartz-vein deposits in metasedimentary rocks, and a low potential for nickel and copper in gabbro. These types of deposits are known in the range, and the rocks and structures of the range are favorable for discovery of further deposits. A low potential exists for the development of geothermal energy along faults on the margins of the range. Occurrences of sand and gravel in the study area are too inaccessible and remote to have any significant resource potential.

Mining activity:

The Cottonwood Canyon mining district is in the WSA. Silver and antimony have been produced with tetrahedrite being the host mineral for the silver. In the southern part of the study area are two properties, the Garnet and the Nash, which have known tungsten values.

July 1989 BLM records show 63 claims in and near the WSA.

Mineral setting:

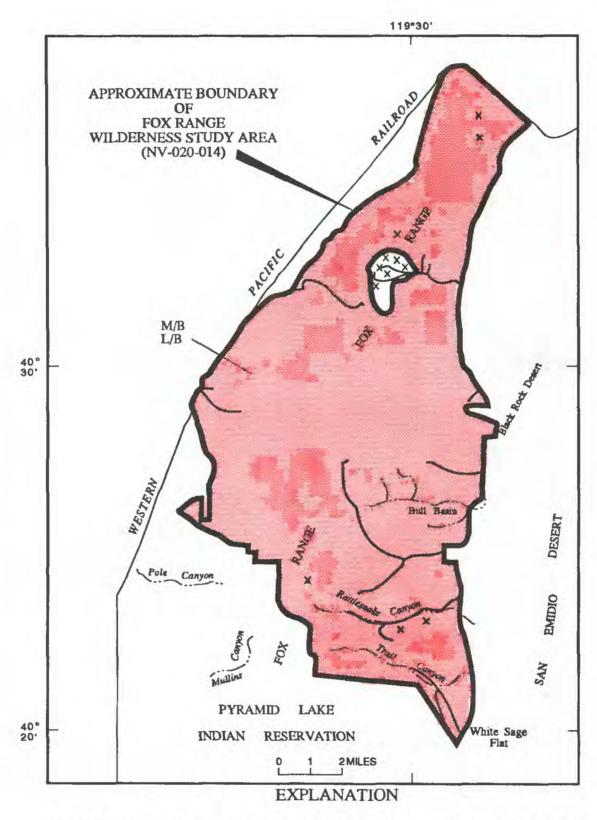
The Fox Mountain Range is a large east-tilted basin-and-range block bounded by major high-angle normal faults on the west side. It is composed of Mesozoic, and possibly Paleozoic, highly sheared, metasedimentary rocks intruded by Cretaceous granitic rocks. These rocks are overlain by a moderately thick sequence of Tertiary volcanic and sedimentary rocks.

Recommendations: The Fox Mountain Range is poorly known geologically, and extensive field studies are needed to better understand the mineral potential of the The Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey.

References:

Bonham, H.F. and Papke, K.G., 1969, Geology and Mineral Deposits of Washoe and Storey Counties, Nevada: Nevada Bureau of Mines and Geology Bull. 70, 140 p.

Overton, T.D., 1947, Mineral Resources of Douglas, Ormsby, and Washoe Counties: Nevada Bureau of Mines and Geology Bull. 46, 91 p.



M/B Geologic terrane having moderate mineral resource potential for gold, silver, and tungsten with certainty level B

L/B Geologic terrane having low mineral resource potential for lead, silver, nickel, copper, and geothermal with certainty level B

Mineral resources of the Fox Mountain Range Wilderness Study Area.

Gabbs Valley Range

Area number:

NV-030-407

Size (acres):

79,600

Status of

This area was not studied by the U.S. Bureau of Mines or the U.S.

Geological Survey. mineral surveys:

Identified mineral resources (known):

Manganese occurs at the Ball Bearing mine.

Mineral resource potential

(undiscovered):

The Gabbs Valley Range study area has moderate potential for gold, silver, mercury, manganese, and antimony. The area has low potential for lead, zinc, copper, iron, tungsten, uranium, and thorium. There is no potential for oil and gas resources.

Mining activity: The Ball Bearing manganese prospect, in the north part of the WSA, contains manganese near the end of a road with a cherry-stemmed WSA boundary. No production from the Ball Bearing prospect was reported as of 1959 (Trengrove, 1959, figure 1). A small amount of mercury has been produced northeast of the Ball Bearing prospect at the Poinsettia mine, from shear zones in andesite tuffs and flows (U.S. Bureau of Mines, 1965, p. 277).

Also noted is the Gabbs claim group (owned by Lacana) which covers a strong gold, silver, antimony, and mercury anomaly. Another claim group, the Paint Rock group, covers a strong gold, silver, and mercury anomaly associated with jasperoid.

July 1989 BLM records show at least 250 claims active in the study area, particularly in the southern half.

Mineral setting:

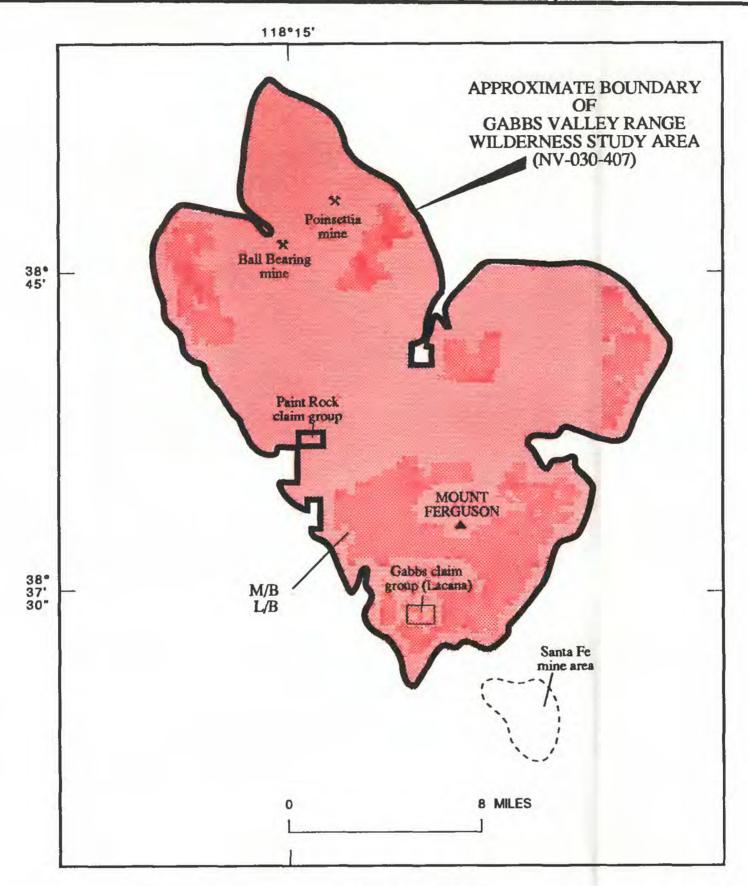
The Gabbs Valley Range is underlain mostly by volcanic rocks of Tertiary age that consist largely of rhyolitic ash-flow tuff and andesitic lava flows. Small intrusive stocks of Mesozoic and Tertiary age cut these rocks in several places in the study area. Volcanic and sedimentary rocks of Jurassic and Triassic age underlie a small area in the northern part of the study area.

Recommendations: The Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey.

References:

Ekren, E.B., and Byers, F.M., Jr., 1978a, Preliminary geologic map of the Luning NE Quadrangle, Nevada: U.S. Geological Survey Open-File Map OF 78-915, scale 1:48,000.

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- _____1978c, Preliminary geologic map of the Luning SW Quadrangle, Nevada: U.S. Geological Survey Open-File Map OF 78-917, scale 1:48,000.
- _____1978d, Preliminary geologic map of the Luning SE Quadrangle, Nevada: U.S. Geological Survey Open-File Map OF 78-918, scale 1:48,000.
- Ekren, E.B., Byers, F.M., Jr., Hardyman, R.F., Marvin, R.F., and Silberman, M.L., 1982, Stratigraphy. preliminary petrology and some structural features of Tertiary volcanic rocks in the Gabbs Valley and Gillis Ranges, Mineral County, Nevada: U.S. Geological Survey Bulletin 1464, 54 p.
- Flannaca, Mike, 1988, Geology of the Santa Fe gold-silver deposit, Mineral County, Nevada, in Shaddrick, D. R., Hunsaker, E. L., Hafen, P., and Buffa, R., Precious metal deposits of west central Nevada: Society of Mining Engineers, p. 233-239.
- Great Basin GEM Joint Venture, 1983, Gabbs Valley G-E-M Resources Area (GRA NO. NV-11) technical report (WSAs NV 030-407): Reno, Nevada, Great Basin GEM Joint Venture for U.S. Bureau of Land Management contract YA-554-RFP2-1054 Open-File Report, 33 p.
- Ross, D.C., 1961, Geology and mineral deposits of Mineral County, Nevada: Nevada Bureau of Mines Bulletin 58, 98 p.
- Trengove, R.R., 1959, Reconnaissance of Nevada manganese deposits: U.S. Bureau of Mines Report of Investigations 5446, 40 p.
- U.S. Bureau of Mines, 1965, Mercury potential of the United States: U.S. Bureau of Mines Information Circular 8252, 376 p.



EXPLANATION

- M/B Geologic terrane having moderate mineral resource potential for gold, silver, manganese, mercury, and antimony with certainty level B
- L/B Geologic terrane having low mineral resource potential for lead, zinc, copper, iron, tungsten, uranium, and thorium with certainty level B

Mineral resources of the Gabbs Valley Range Wilderness Study Area.

Area number: (Size acres):

Garrett Buttes NV-050-235 11,835

Status of

mineral surveys:

This area was not studied by the U.S. Bureau of Mines or the U.S.

Geological Survey.

Identified mineral resources (known):

No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential (undiscovered): The south Virgin mountains are underlain by metamorphosed Precambrian granitic and sedimentary rocks which contain beryllium in pegmatite. The Garrett Buttes study area contains abundant pegmatite, indicating that the resource potential for beryllium in the entire area is moderate. Less than 10,000 ounces of gold have been produced from the granitic rocks in the area. The resource potential for gold is moderate.

There is low potential for oil and gas (Sandberg, 1983).

Mining activity: No mining activity is known in the WSA. July 1989 BLM records show no active mining claims in the WSA.

Mineral setting:

Four rock types are defined in this area: tuffaceous sediments, sand dune and beach deposits, metamorphic rocks, and granitic rocks. The eastern portion iof the study area borders on a western extension of a large metamorphic and granitic field.

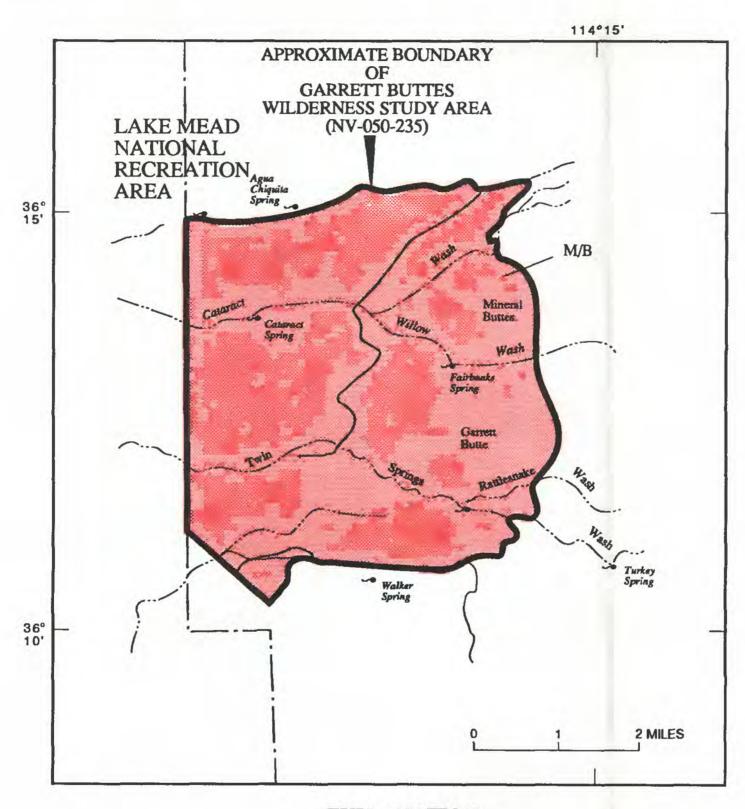
Recommendations: A detailed study of the area should be done to determine the thickness of the tuffaceous sediments and also whether or not the older granitic rocks extend under the entire area. Detailed geologic mapping would also locate any further westward occurances of pegmatite. The Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey.

References:

Great Basin GEM Joint Venture, 1983, Lake Mead G-E-M resources area (GRA no. NV-35) technical report (WSA's NV-050-0231, 050-0233, 050-0235, 050-0236, and 050-0238): U.S. Bureau of Land Management, contract YA-553-RFP2-1054, 33 p.

Longwell, C.R., Pampeyan, E.H., Bowyer, Ben, and Roberts, R.J., 1965, Geology and mineral deposits of Clark County, Nevada: Nevada Bureau of Mines Bulletin 62, 218 p.

Sandberg, C.A., 1983, Petroleum potential of wilderness lands in Nevada: U.S. Geological Survey Circular 902-H, 11 p.



EXPLANATION

M/B Geologic terrane having moderate mineral resource potential for gold, oil and gas, and beryllium with certainity

Mineral resources of the Garrett Buttes Wilderness Study Area.

Area number:

Goshute Canyon NV-040-015

Size (acres):

35,594 of which 22,225 were studied at the request of the U.S. Bureau of

Land Management.

Status of

mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of

Mines (Poole and others, 1988).

Identified mineral resources (known):

No mineral resources have been identified within the wilderness study

area.

Mineral resource potential (undiscovered):

The study area has moderate mineral resource potential for gold, silver, antimony, copper, lead, zinc, and tungsten in and near jasperoid replacement bodies. The rest of the study area has low mineral resource potential for the same metals. The study area has low energy resource

potential for coal, oil and gas, uranium, and geothermal energy.

Mining activity: July 1989 BLM records show 165 mining claims in and immediately adjacent to the WSA. Most of the claims are in the southern part of the area, however there are a few in the extreme northern part. FMC currently holds a number of claims in this area and Amselco Exploration held claims in the area as recently as 1986. The rest of the claim activity

involves small mining and exploration operators.

Mineral setting:

The central Cherry Creek Range is underlain by a west-dipping section of carbonate rocks and lesser amounts of shale and quartzite of Cambrian through Pennsylvanian age (see geologic time chart in Appendix). Notable geologic structures in the area include: (1) a thurst-fault system in the southwestern part of the area along which the Mississippian Chainman Shale overlies older Mississippian Joana Limestone or Devonian Guilmette Limestone; (2) a northwest-trending oblique-slip fault system that crosses the range along the southern margin of the agea; (3) a series of arcuate faults in the eastern part of the area that moved large blocks of Paleozoic rocks downward toward Steptoe Valley; and (4) a major normal fault system along the east side of the range.

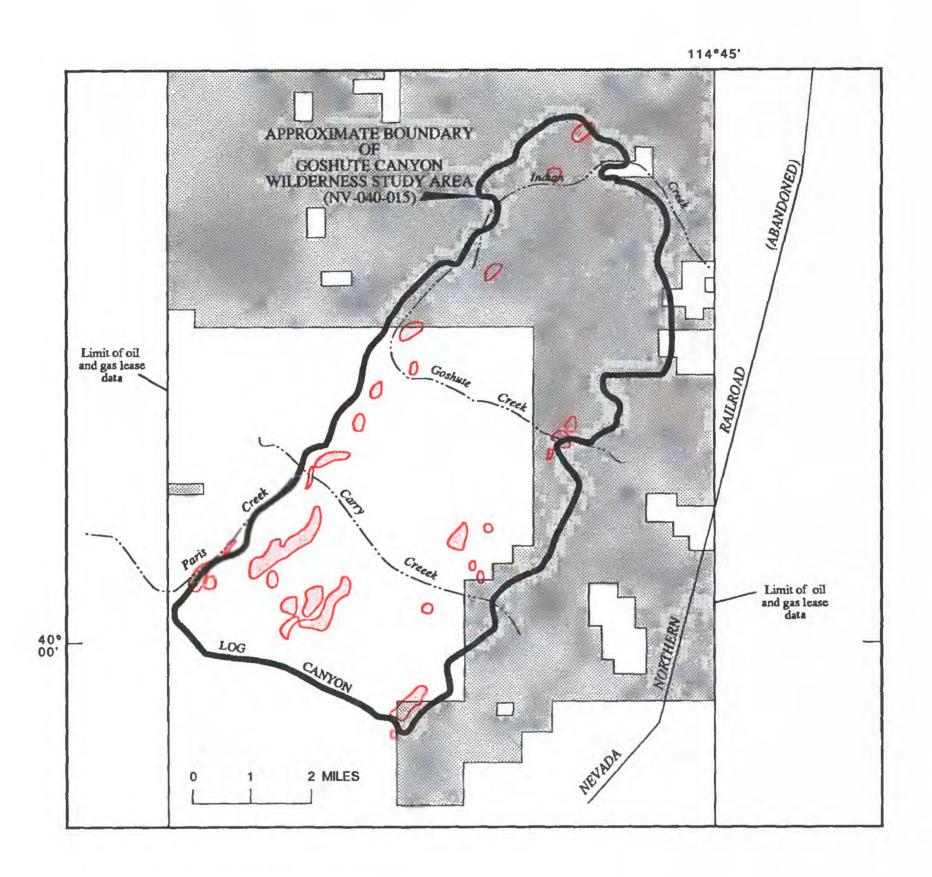
Recommendations:

Moderate interest in this area indicates there may be further mineral discoveries. As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 13,369 acres that constitute the balance.

References:

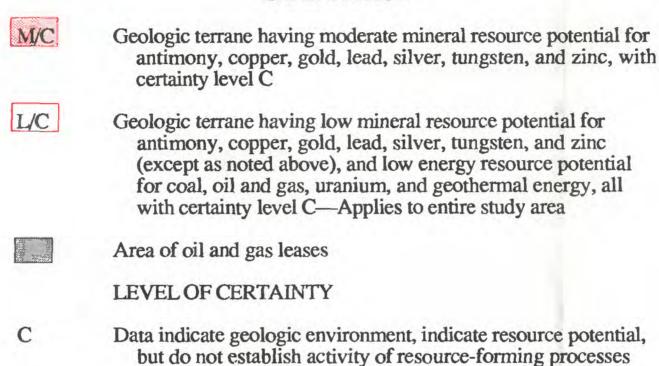
Great Basin GEM Joint Venture, 1983, Goshute Canyon G-E-M Resources Area (GRA NO. NV-03) Technical Report (WSA NV 040-015): prepared for U.S. Bureau of Land Management, 33 p.

- Johnson F.L., 1986, Mineral Resources of the Goshute Canyon Study Area, Elko and White Pine Counties, Nevada: U.S. Bureau of Mines Open File Report MLA 77-86, 36 p.
- Poole, F. G., Elrick, M., Tucker, R. E., Harris, R. N., Oliver, H. W., and Johnson F.L., 1988, Mineral Resources of the Goshute Canyon Wilderness Study Area, Elko and White Pine Counties, Nevada: U.S. Geological Survey Bulletin 1725-E, 13 p.
- Smith R.M., 1976, Geology and Mineral Resources of White Pine County, Nevada: Nevada Bureau of Mines and Geology Bulletin 85, part II, p. 36-105.



Mineral resources of the Goshute Canyon Wilderness Study Area.

EXPLANATION



Explanation, mineral resources of the Goshute Canyon Wilderness Study Area.

Area number:

Goshute Peak NV-010-033

Size (acres):

69,770 of which 61,004 were studied at the request of the U.S. Bureau of

Land Management.

Status of

mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of

Mines (Ketner and others, 1987).

Identified mineral resources (known):

A Carlin-type disseminated gold occurrence is present on the western side of the WSA, about 2-4 mi southwest of Goshute Peak. High-calcium limestone is found throughout much of the WSA.

Mineral resource potential (undiscovered):

Part of the Goshute Peak Wilderness Study Area has low resource potential for gold. There is high resource potential for high-purity limestone. The area has low resource potential for oil and gas.

Mining activity:

Battle Mountain Exploration Co. drilled the disseminated gold occurrence during the summers of 1985-1986. Numerous unpatented mining claims are on file with the BLM.

Mineral setting:

Rock formations of the Goshute Peak Wilderness Study Area are mainly limestone and dolomite ranging in age from Cambrian to Permian (245 to 540 million years old). Less extensive areas are underlain by younger igneous rocks and unconsolodated alluvium. Principal structures include low angle planar faults that locally cut out portions of the stratigraphic column, listric, or curved, faults that merge from high angles to low angle, and near-vertical planar faults.

Recommendations:

As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 8,766 acres that constitute the balance.

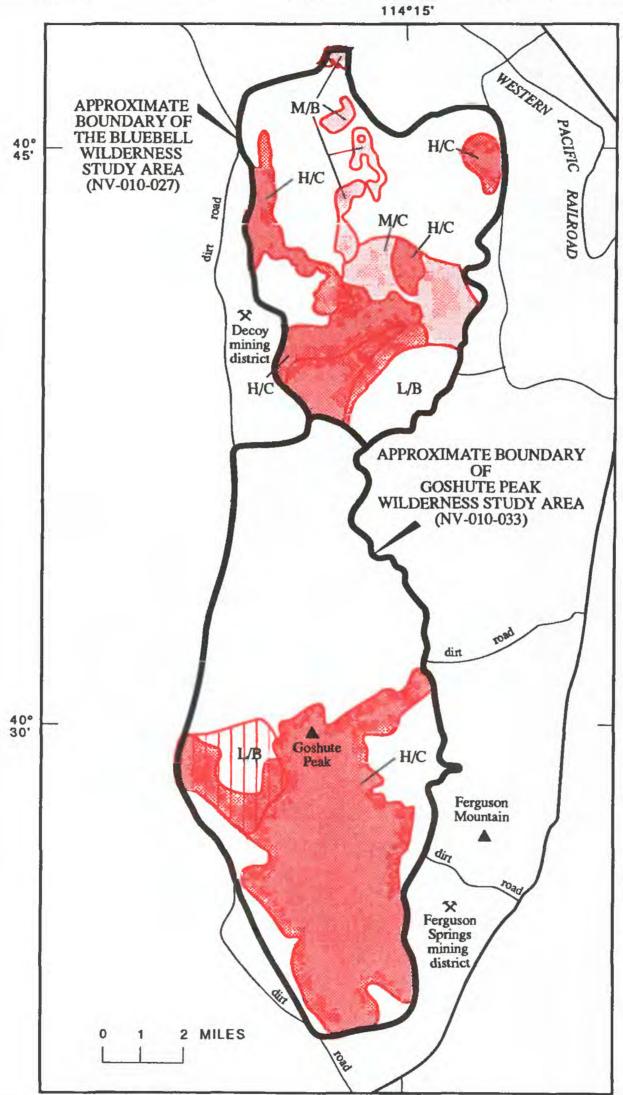
References:

Brown, S.D., 1985, Mineral resources of part of the Bluebell (NV-010-027) and Goshute Peak (NV-010-033) Wilderness Study Areas, Elko County, Nevada: U.S. Bureau of Mines Open-File Report MLA 66-85, 22 p.

Day, W.C., Elrick, Maya, Ketner, K.B., and Vaag, M.K., 1987, Geologic map of the Bluebell and Goshute Peak Wilderness Study Areas, Elko County, Nevada: U.S. Geological Survey Miscellaneous Field Studies Map MF-1932.

Granger, A.E., Bell, M.M., Simmons, G.C., Lee, Florence, 1957, Geology and mineral resources of Elko County, Nevada: Nevada Bureau of Mines Bulletin 54, 190 p.

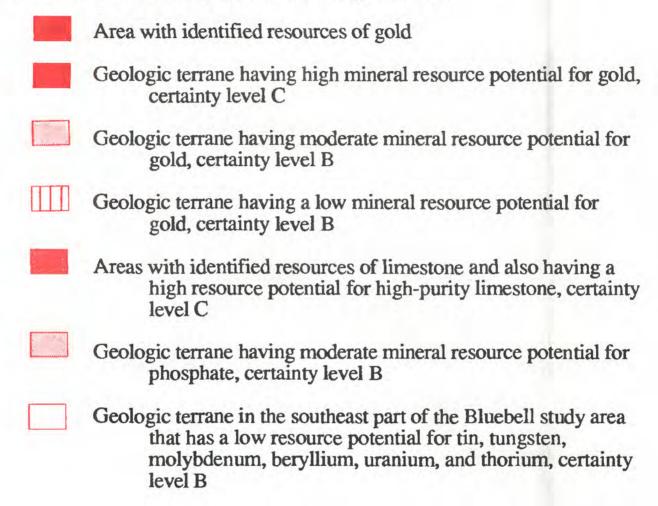
- Hill, J.M., 1916, Notes on some mining districts in eastern Nevada: U.S. Geological Survey Bulletin 648, p. 97-98.
- Ketner, K.B., Day, W.C., Elrick, M., Vaag, M.K., Gerlitz, C.N., Barton, H.N., Saltus, R.S., and Brown, S.D., 1987, Mineral resources of the Bluebell and Goshute Peak Wilderness Study Areas, Elko County, Nevada: U.S. Geological Survey Bulletin 1725-C, 18 p.



Mineral resources of the Goshute Peak Wilderness Study Area.

EXPLANATION

[Identified resources of common sand and gravel are present in small areas throughout both the Bluebell and Goshute Peak study areas. Both study areas have low resource potential for energy sources]



Explanation, mineral resources of the Goshute Peak Wilderness Study Area.

Grapevine Mountains (Bonnie Clair Flat)

Area number:

NV-060-355 66,800

Size (acres):

mineral surveys:

This area was not studied by the U.S. Geological Survey or the U.S.

Bureau of Mines.

Identified mineral resources (known):

Status of

No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential (undiscovered): The Grapevine Mountains Wilderness Study Area has moderate potential for undiscovered deposits of gold in placers. There is no potential for oil and gas (Sandberg, 1983).

Mining activity: There are no known active mines within the WSA. According to the Nevada Mining Association (1988) a plan of operation for a placer mine in the WSA was filed with the BLM. July 1989 BLM records show three active and 167 inactive mining claim locations within or adjacent to the WSA. A large claim block is situated near the NE corner.

Mineral setting:

The Grapevine Mountains are underlain by Paleozoic sedimentary rocks consisting of the Cambrian Nopah Formation and Ordovician Pogonip Group as well as a Mississippian sequence of shaley rocks. The older rocks rest on the Mississippian rocks in thrust contact, the thrust is perhaps part of the Last Chance thrust. The Paleozoic rocks are largely covered by Tertiary volcanic and sedimentary rocks that include the Timber Mountain Tuff and dacite intrusions.

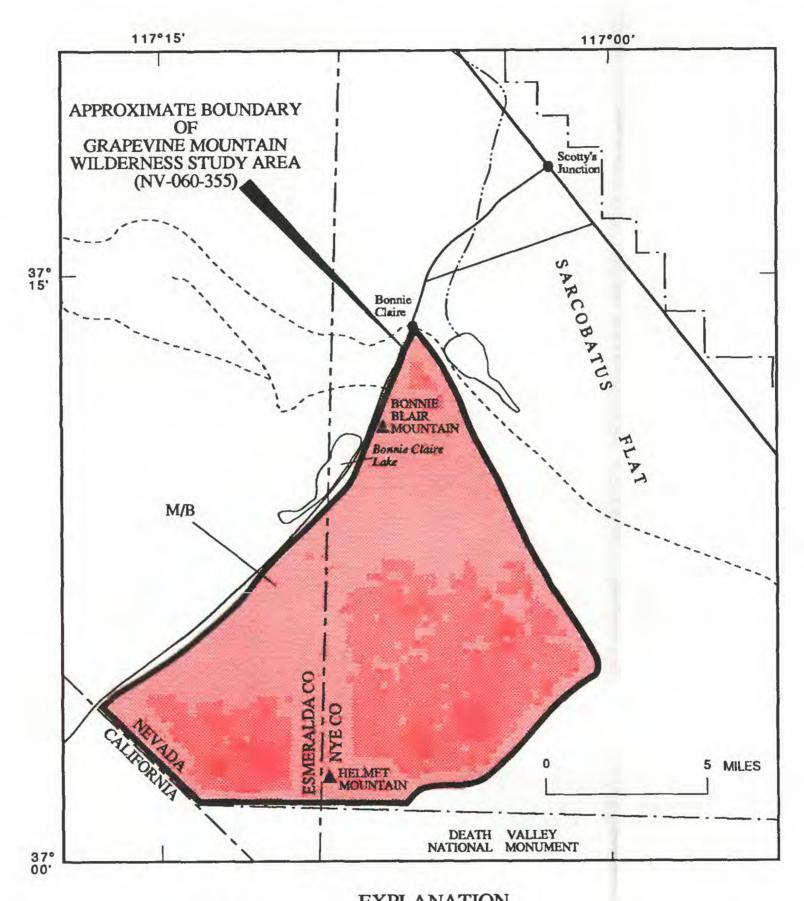
Recommendations: The Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey.

References:

Great Basin GEM Joint Venture, 1983, Grapevine Canyon G-E-M Resources Area (GRA No. NV.-21) Technical Report (WSAs NV-050-0354 and 050-0355): Prepared for the U.S. Bureau of Land Management, contract YA-553-RFP2-1054, 33 p.

Nevada Mining Association, 1988, Nevada BLM Wilderness Study Areas, Mineral Potential Handbook: unpublished report.

Sandberg, C.A., 1983, Petroleum potential of wilderness lands in Nevada: U.S. Geological Survey Circular 902-H, 11 p.



EXPLANATION

M/B Geologic terrane having moderate mineral resource potential for gold with certainty level B

Mineral resources of the Grapevine Mountains Wilderness Study Area.

High Rock Canyon CA-020-913B

Area number: Size (acres):

34,758 of which 11,980 were studied at the request of the U.S. Bureau of

Land Management.

Status of mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S.

Bureau of Mines (Turrin and others,

1988).

Identified mineral resources (known):

No mineral resources are identified in the wilderness study area.

Mineral resource potential

(undiscovered):

Studies show that parts of the study area have a high potential for zeolite mineral resources in altered tuffaceous sediments, a moderate resource potential for gold, silver, and mercury in epithermal-type precious-metal deposits, and a low potential for uranium, lithium, geothermal energy, oil, and gas resources.

Mining activity:

The wilderness study area is not in a mining district. Six placer claims were located in 1911. There are no current mining claims in the wilderness study area according to October, 1988, U.S. Bureau of Land Management records. Major mining companies have explored for disseminated gold-silver-mercury deposits near the wilderness study area

Mineral setting:

The area is underlain by a sequence of Tertiary rhyolitic to dacitic ashflow tuffs and flows. Two major sets of faults that trend northwest and northeast are present within the study area.

Recommendations:

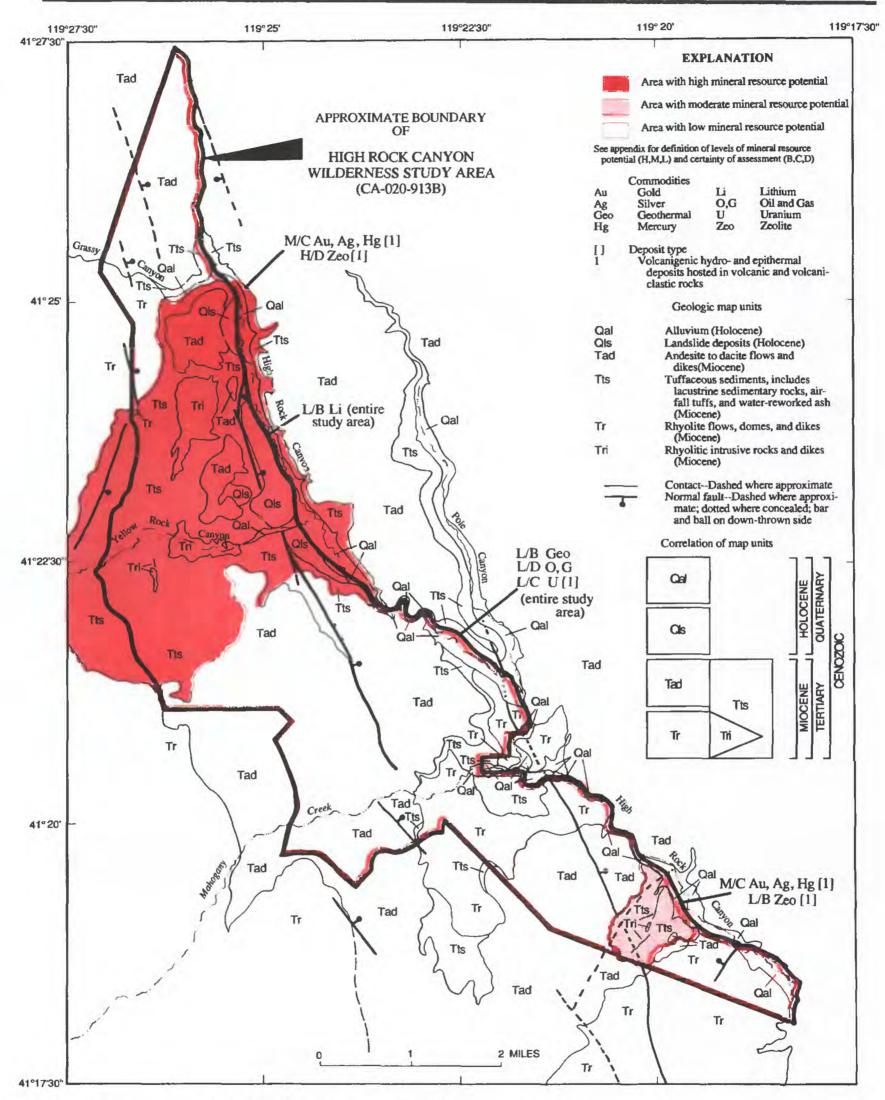
As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 22,778 acres that constitute the balance. Massive opal and opalized breccia is present in the area, the same rock types that have been explored for gold-mercury deposits nearby. It is recommended that a detailed evaluation of these opalized areas be conducted.

References:

Ach, J.A., Plouff, Donald, and Turner R.L., Schmauch, S.W., 1987, Mineral resources of the East Fork High Rock Canyon wilderness study area, Washoe and Humboldt Counties, Nevada: U.S. Geological Survey Bulletin 1707-B, 14 p.

Bonham, H.F., 1969, Geology and mineral deposits of Washoe and Storey Counties, Nevada: Nevada Bureau of Mines Bulletin 70, 140 p.

- Connors, R.A., Robinson, M.L., Bukofski, J.F., Meyer, W.T., and Howarth, R.J., 1982, Geochemical and geostatistical evaluation, wilderness study areas, Winnemucca district, northwest Nevada: prepared for BLM under contract YA-553-CT1-1096 by Barringer Resources, Inc., Golden, CO, 72 p. and appendices.
- Geodata International, Inc., 1979, Aerial radiometric and magnetic survey-Vya national topographic map-Nevada: U.S. Department of Energy Open-File Report GJBX-136(79), vol. 1, 51 p., and appendices; vol. 2, 72 p.
- Neumann, T.R., and Close T.J., 1985, Mineral resources of the High Rock Lake Wilderness Study Area, Humboldt County, Nevada: U.S. Bureau of Mines Open-File Report MLA 38-85, 14 p.
- Schmauch, S.W., 1986, Mineral resources of the East Fork High Rock Canyon study area, Humboldt and Washoe Counties, Nevada: U.S. Bureau of Mines Open-File Report MLA 60-86, 9 p.
- Scott, D.F., 1987, Mineral resources of the High Rock Canyon study area, Washoe County, Nevada: U.S. Bureau of Mines Open-File Report MLA 14-87, 18 p.
- Stewart, J.H., and Carlson, J.E., compilers, 1978, Geologic map of Nevada: U.S. Geological Survey in cooperation with the Nevada Bureau of Mines and Geology, scale 1:500,000.
- Turrin, B.D., Bergquist, J.R., Turner, R.L., Plouff, Donald, and Scott, D.F., 1988, Mineral resources of the High Rock Canyon Wilderness Study Area, Washoe County, Nevada: U.S. Geological Survey Bulletin 1707-D, 14 p.



Mineral resources of the High Rock Canyon Wilderness Study Area.

Area number:

High Rock Lake NV-020-007

Size (acres):

62,382 of which 14,000 were studied at the request of the U.S. Bureau of

Land Management.

Status of

mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of

Mines (Noble and others. 1987).

Identified mineral resources (known):

The Soldier Meadow Known Geothermal Resource Area occurs along the north boundary of the study area.

Mineral resource potential (undiscovered):

A low potential exists throughout the study area for undiscovered volcanic-hosted resources of mercury, uranium, and disseminated gold. The northern part of the study area has low potential for undiscovered geothermal energy resources.

Mining activity:

The Donnelly mining district, about ten miles south of the study area, has reported production of \$100,000 in gold and silver. Little activity has been reported from this district in recent years. A zeolite, clinoptilolite, occurs at Donnelly Creek, about eight miles south of the study area.

Several claims, staked for uranium southwest of the study area, disclosed no resources when examined by U.S. Bureau of Mines personnel.

Scattered gold and silver anomalies occur about 15 miles south of the study area in the vicinity of the Hog Ranch gold mine; amount of prospecting here has not been determined.

Two miles south of the study area, precious and common opal are mined sporadically in Willow Canyon.

July 1989 BLM records show no claims active in the WSA.

Mineral setting:

The study area is underlain by slightly tilted Miocene rhyolitic volcanic rocks. Rocks in the northwestern part of the study area locally exhibit weak hydrothermal alteration. A major active normal fault system bounds the west margin of the range.

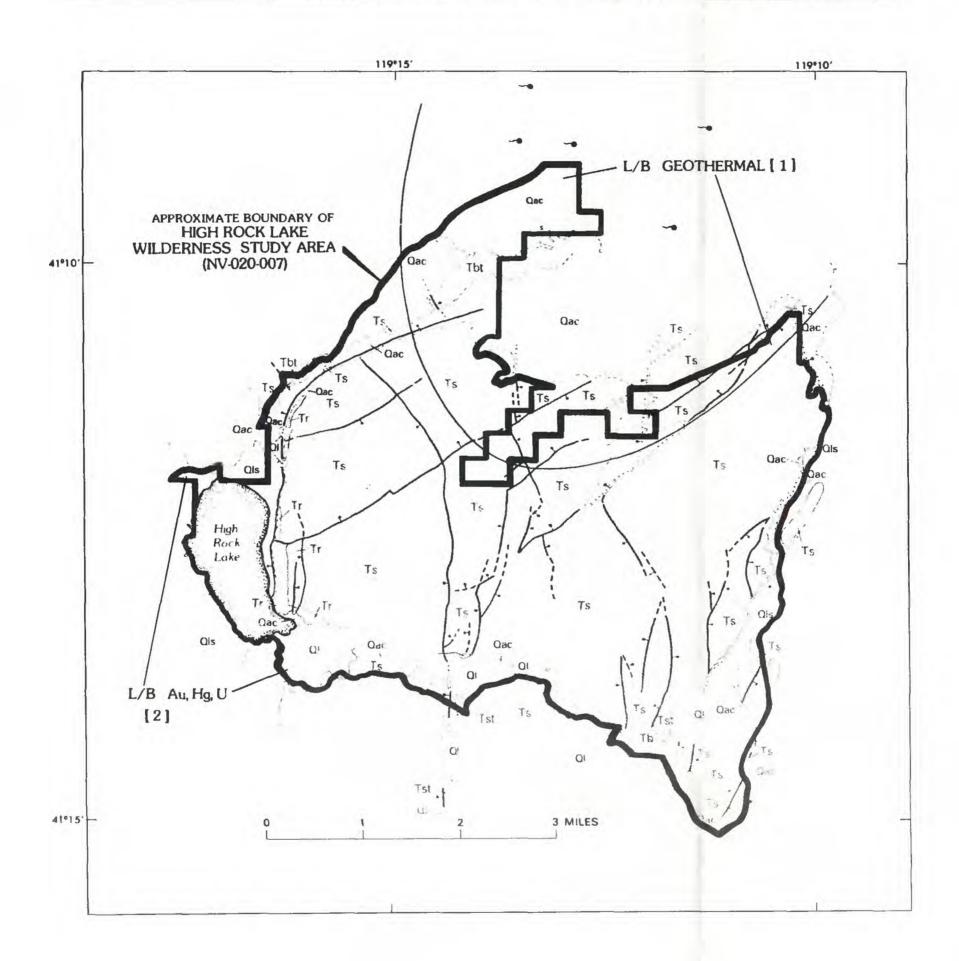
Recommendations:

As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 48,382 acres that constitute the balance.

References:

Bonham, H.F., 1969, Geology and mineral deposits of Washoe and Storey Counties, Nevada, with a section on industrial rock and mineral deposits by Keith G. Papke: Nevada Bureau of Mines and Geology Bulletin 70, 140 p.

- Conners, R.A., Robinson, M.L., Bukofski, J.F., Meyer, W.T., and Howarth, R.J., 1982, Geochemical and geostatistical evaluation of wilderness study areas, Winnemucca District, northwestern Nevada: Golden, Colorado, Barringer Resources, Incorporated for U.S. Bureau of Land Management contract Open-File Report, v. 1-5, 2 plates.
- Greene, R.C., and Plouff, Donald, 1981, Location of a caldera source for the Soldier Meadow Tuff, northwestern Nevada, indicated by gravity and aeromagnetic data: Geological Society of America Bulletin, Part I, v. 92, p. 4-6 and Part II, v. 92, p. 39-56.
- Muffler, L.J.P., ed., 1979, Assessment of geothermal resources of the United States--1978: U.S. Geological Survey Circular 790, 163 p., map 1 scale 1:250,000.
- Neumann, T.R., and Close, T.J., 1985, Mineral resources of the High Rock Lake Wilderness Study Area (BLM No. NV-020-007), Humboldt County, Nevada: U.S. Bureau of Mines Open-File Report MLA 38-85, 14 p.
- Noble, D.C., McKee, E.H., Smith, J.G., and Korringa, M.K., 1970, Stratigraphy and geochronology of Miocene volcanic rocks in northwestern Nevada: U.S. Geological Survey Professional Paper 700-D, p. D23-D32.
- Noble, D.C., Plouff, Donald, Bergquist, J.R., Neumann, T.R., and Close, T.J, 1987, Mineral resources of the High Rock Lake Wilderness Study Area, Humboldt County, Nevada: U.S. Geological Survey Bulletin 1707-A, 9 p.
- Stewart, J.H., and Carlson, J.E., compilers, 1978, Geologic map of Nevada: U.S. Geological Survey in cooperation with the Nevada Bureau of Mines and Geology, scale 1:500,000.
- Stuart, E.J., Bornhorst, T.J., Rose, W.I., Jr., and Noble, D.C., 1983, Distribution and mobility of uranium and thorium in the peralkaline Soldier Meadow Tuff, northwestern Nevada: Economic Geology, v. 78, p. 353-358.
- Vanderburg, W.O., 1938, Reconnaissance of mining districts in Humboldt County, Nevada: U.S. Bureau of Mines Information Circular 6995, 54 p.
- Wilden, Ronald, 1964, Geology and mineral deposits of Humboldt County, Nevada: Nevada Bureau of Mines Bulletin 59, 154 p.



Mineral resources of the High Rock Lake Wilderness Study Area.

EXPLANATION

	Area with low mineral resource potential—See appendix for definition of levels of mineral resource potential and certainty of assessment
	Commodities
Au	Gold
Hg	Mercury
U	Uranium
	Geothermal
	Types of deposits
1	Geothermal energy
2	Volcanic-hosted hydrothermal deposits
	Geologic map units
Qac	Alluvium and colluvium (Quaternary)
QI	Landslide deposits (Quaternary)
Qls	Lake sediments (Quaternary)
Tbt	Bedded tuff (Middle Miccene)
Ts	Soldier Meadow Tuff (Middle Miocene)
Tr	Rhyolite (Middle Miocene)
Tst	Summit Lake Tuff and tuff of Trough Mountain (Middle Miocene)
Tb	Basalt (Middle Miocene to Upper Oligocene)
	Contact—Dashed where approximately located; dotted where concealed
•	Fault—Dashed where approximately located or inferred; dotted where concealed; bar and ball on downthrown side
we	Hot spring

Ireteba Peaks NV-050-438

Area number: Size (acres):

14,994 of which 13,374 were studied

at the request of the U.S. Bureau of

Land Management.

Status of

mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of

Mines (Conrad and others, 1990).

Identified mineral resources (known):

There are identified subeconomic resources totalling 240,000 tons of 0.037 oz/t gold, 0.12 oz/t silver, and minor copper on the Cobalt claims

(Causey, 1988).

Mineral resource potential (undiscovered):

There is moderate potential for gold, silver, copper, lead, and zinc in the southeast part of the study area. Low potential for these commodities exists throughout the rest of the study area. A uranium occurrence has been noted in Precambrian rocks on the west edge of the study area (Garside, 1973), suggesting low potential for uranium in these rocks. However, later studies have been unable to confirm this occurrence. The study area has low potential for molybdenum, cobalt, nickel, tungsten, beryllium, niobium, and thorium. There is abundant sand and gravel on the east and west sides of the study area, but similar deposits are widely available outside the study area and closer to major markets; there is low potential for significant resources of these commodities in the study area. There is no potential for oil and gas resources.

Mining activity:

The WSA is on the southern edge of the Eldorado mining district, the northeastern edge of the Searchlight mining district, and the northwestern edge of the Newberry mining district. At least \$6 million in gold, silver, copper, lead, and zinc along with minor mercury were recovered from the Eldorado district; \$7 million, mostly gold from the Searchlight district; and less than \$200,000 in gold and silver, from the Newberry district.

Recent mining activity has been done by small operators on the northwestern and southeastern edges of the WSA. Just west of the WSA there was extensive claim staking on pediment surfaces. Activity in 1988 consisted of mining the pediment gravel and processing in separation mills located on the claims. There is one patented claim in the WSA (Crystal Lode) and several on the southeastern (Sazarac group) and southwestern borders (St Louis group).

July 1989 BLM records show 18 lode and 6 placer mining claims in the WSA.

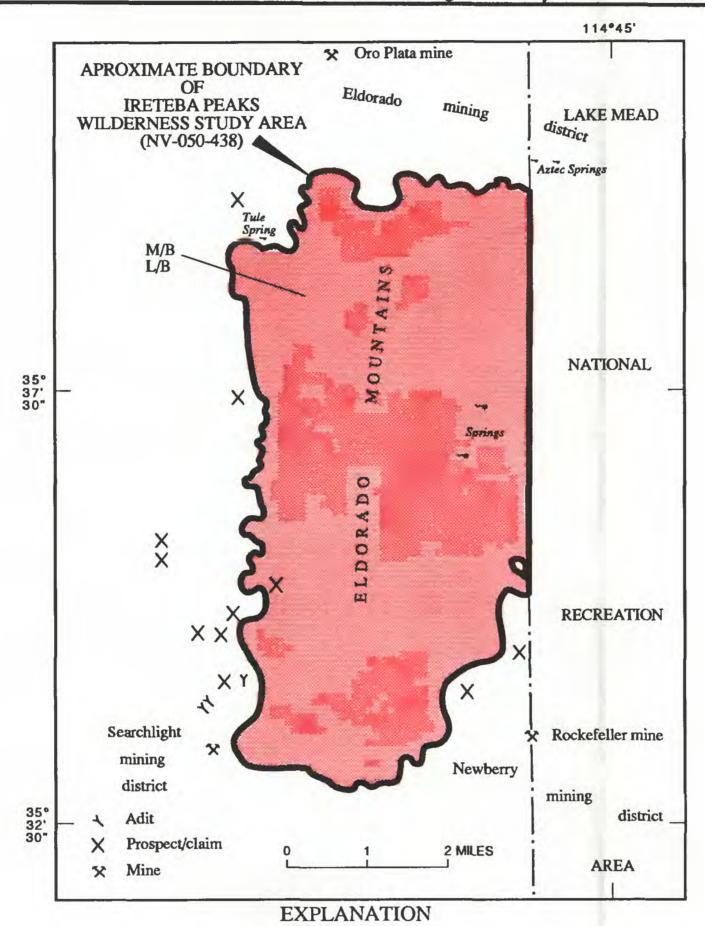
Mineral setting:

The Ireteba Peaks study area is underlain primarily by numerous dikes and small granitic stocks of Miocene age that intrude the Precambrian schist, gneiss, and granite that underlie small parts of the study area.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 1,620 acres that constitute the balance.

References:

- Causey, J.D., 1988, Mineral resources of the Ireteba Peaks study area, Clark County, Nevada: U.S. Bureau of Mines Open File Report MLA 46-88, 46 p.
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- Garside, L.J., 1973, Radioactive mineral occurrences in Nevada: Nevada Bureau of Mines and Geology Bulletin 81, 121 p.
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- Smith, P.L., and Tingley, J.V., 1983, A mineral inventory of the Esmeralda-Stateline Resource Area, Las Vegas District, Nevada: Nevada Bureau of Mines and Geology Open-file Report 83-11, 173 p.
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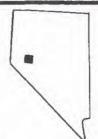
M/B Geologic terrane having moderate mineral resource potential for gold, silver, copper, lead, and zinc with certainty level B

L/B Geologic terrane having low mineral resource potential for gold, silver, copper, lead, zinc, uranium, niobium, thorium, molybdenum, cobalt, nickel, tungsten, beryllium, and sand and gravel with certainty level B

Mineral resources of the Ireteba Peaks Wilderness Study Area.

Area number: Size (acres):

Job Peak NV-030-127 90,209



Status of

mineral surveys:

This area was not studied by the U.S. Bureau of Mines or the U.S.

Geological Survey.

Identified mineral resources (known):

No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential (undiscovered):

This area has moderate potential for epithermal gold-silver mineralization of Comstock-type (quartz-adularia veins) in altered Tertiary volcanic rocks in West Job Canyon near the northern end of the area and in Elevenmile and East Lee Canyons in the southeastern part of the area, where altered rocks locally contain areas of quartz veins; low potential for geothermal energy along the east side of the area in Dixie Valley; low or no potential for oil and gas resources; and low potential for industrial materials.

Mining activity:

In the 1860s, the La Plata mining district, just south of the Job Peak WSA, experienced a minor rush of activity associated with silver exploration, but very little silver was actually produced. Two mills were built, one in Elevenmile Canyon, on the southern border of the study area, and one in La Plata Canyon, south of the WSA. The Dixie mine, in La Plata Canyon, 1 to 2 miles outside of the southeastern portion of the Stillwater Range, shipped 666 tons of 65 percent CaF₂ (fluorite) to Fallon, Nevada. The Black Hills prospect, another fluorspar property, is also located in La Plata Canyon.

According to U.S. Bureau of Mines Mineral Production Records, the Creeore mine, about two miles north of the WSA, in the IXL mining district, produced a total of 12 tons of ore in 1953 and 1955. From this ore, 81 oz of silver, 560 lb of copper, 2,172 lb of lead, and 134 lb of zinc were recovered.

There are about 225 mining claims in the area (BLM records, July 1989). Portions of the area have also been leased for oil and gas (13,203 acres) or geothermal exploration (15,800 acres). Three wells have been drilled for geothermal energy exploration by Hunt Energy Corporation. Exploration is being conducted by a number of companies.

Mineral setting:

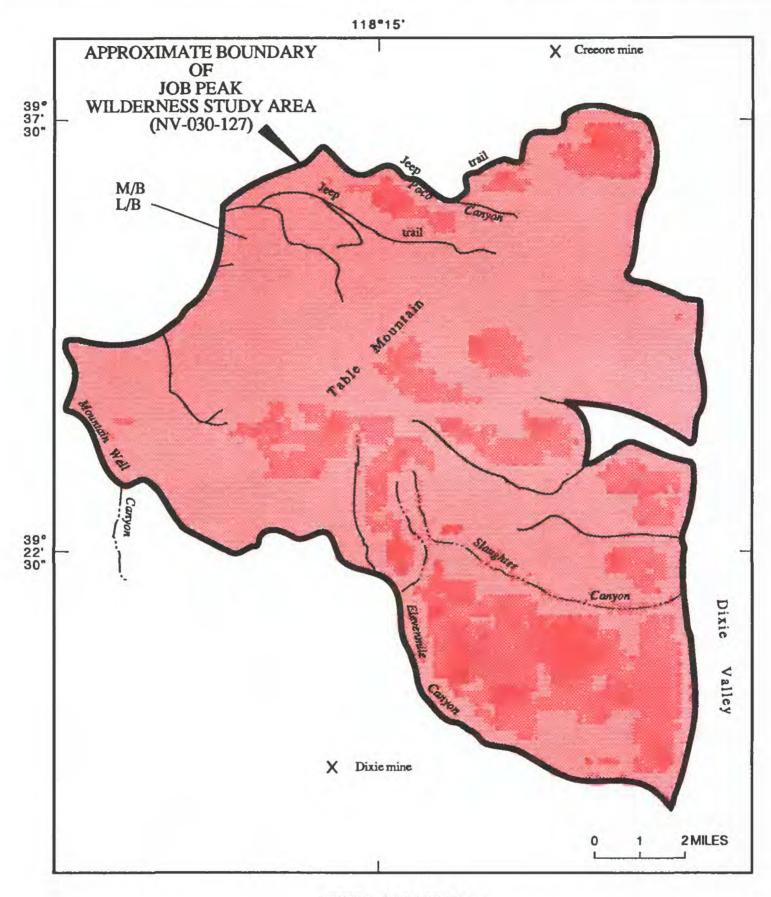
Most of the area is underlain by Oligocene and Miocene volcanic, plutonic, and sedimentary rocks. These rocks include thick sequences of ash-flow tuff that form three small calderas, cogenetic granitic plutons that represent of the roots of the calderas, older andesite flows, rhyolite domes and dikes, lacustrine and fluvial sedimentary rocks, and younger andesite and basalt flows. The ash-flow tuffs, granites, and older andesites were faulted and steeply tilted about 23 Ma and are overlain by flat-lying, unaltered, younger andesites and basalts and intruded by the rhyolite domes. These younger volcanic rocks primarily occur in the western half of the area. Sedimentray rocks locally underlie the younger andesite and basalts. Several areas of hydrothermal alteration that locally contain quartz veins and gold and silver are present in the older volcanic rocks including in West Job Canyon near the northern edge of the area and in the upper parts of Elevenmile and East Lee Canyons near the southeastern end of the area. The eastern and western edges of the area are covered by Quaternary alluvial deposits including basin fill on the east side and lake terraces on the west side. The active (1954) Dixie Valley fault occurs near the eastern edge of the area.

Recommendations:

Detailed mapping and geochemical sampling of altered areas are needed to determine the extent of mineralization. The wilderness study area should be studied as part of a comprehensive mineral survey by the Bureau of Mines and Geological Survey.

References:

- Great Basin GEM Joint Venture, 1983, Stillwater Range G-E-M Resources Area (GRA No. NV-04) Technical Report (WSAs NV 030-104 and 030-127): under contract YA-554-RFP2-1054 for the BLM, Reno, Nevada, 44 p.
- Higgins, L.R., Earnest, D.F., and Cox, A.D., 1988, Nevada BLM Wilderness Study Areas mineral potential handbook: Nevada Mining Association, Reno, Nevada, 257 p.
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- Quade, J., and Tingley, J.V., 1987, Mineral resource inventory--U.S. Navy master land withdrawl area, Churchill County, Nevada: Nevada Bureau of Mines and Geology Open File Report 87-2, 99 p.
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EXPLANATION

M/B Geologic terrane having moderate mineral resource potential for gold and silver with certainty level B

L/B Geologic terrane having low mineral resource potential for geothermal energy, oil and gas, and sand and gravel with certainty level B

Mineral resources of the Job Peak Wilderness Study Area.

Area number:

Size (acres):

Jumbo Springs NV-050-236

3,466

Status of

mineral surveys:

This area was not studied by the U.S. Bureau of Mines or the U.S.

Geological Survey.

Identified mineral resources (known):

No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential

(undiscovered):

There has been minor lead, zinc, and gold production in or near the study area, and beryllium occurs in pegmatite. Abundant pegmatite and the extensive veining systems indicate that the resource potential for these elements is moderate. Although the area was considered by Sandberg (1983) to have low potential for oil and gas, the study area is entirely underlain by Precambrian crystalline rocks and so has no potential for oil

and gas.

Mining activity:

July 1989 BLM records show one active mining claim in the WSA. There are three nearby mines and prospects south and west of the WSA (Lakeshore, Windmill, and Winona). Only the Lakeshore has reported production (\$100,000 in gold).

Mineral setting:

The entire study area is composed of metamorphic and granitic rocks. Highly folded lenses of granite and pegmatite are intercalated with porphyritic rapakivi granite.

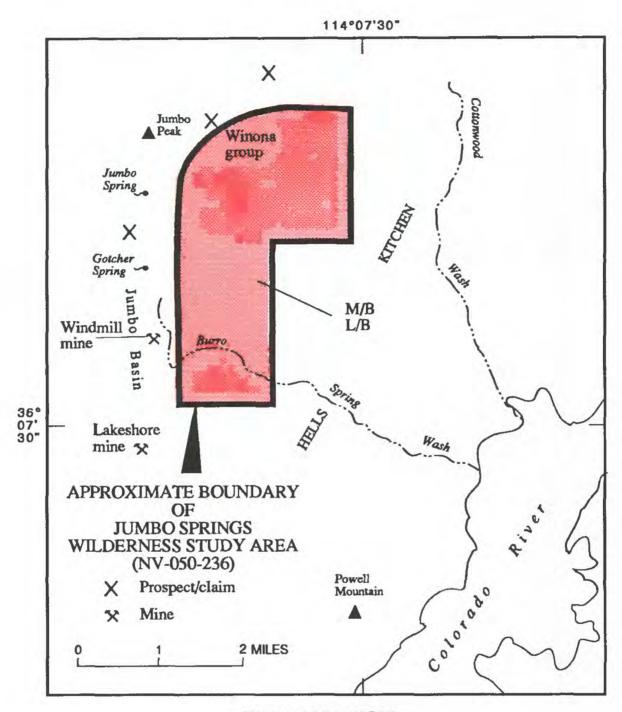
Recommendations: Detailed geologic mapping, geochemical sampling, and geophysical studies would add greatly to the understanding of the resource potential of this area. The Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey.

References:

Great Basin GEM Joint Venture, 1983, Lake Mead G-E-M resources area (GRA no. NV-35) technical report (WSA's NV-050-0231, 050-0233, 050-0235, 050-0236, and 050-0238): Prepared for the U.S. Bureau of Land Management, contract YA-553-RFP2-1054, 33 p.

Longwell, C.R., Pampeyan, E.H., Bowyer, Ben, and Roberts, R.J., 1965, Geology and mineral deposits of Clark County, Nevada: Nevada Bureau of Mines Bulletin 62, 218 p.

Sandberg, C.A., 1983, Petroleum potential of wilderness lands in Nevada: U.S. Geological Survey Circular 902-H, 11 p.



EXPLANATION

- M/B Geologic terrane having moderate mineral resource potential for gold, lead, zinc, beryllium with certainty level B
- L/B Geologic terrane having low mineral resource potential for oil and gas, and sand and gravel with certainty level B

Mineral resources of the Jumbo Springs Wilderness Study Area.

Area number: Size (acres):

Kawich NV-060-019

54,320



Status of

mineral surveys:

This area was not studied by the U.S. Bureau of Mines or the U.S.

Geological Survey.

Identified mineral resources (known):

No mineral resources have been identified in the Wilderness Study Area; however, mineral resource data are not sufficient to evaluate possible ore body extensions into the area from nearby mines and to determine the possible presence of mineral resources at numerous mines and prospects

in the Kawich area.

Mineral resource potential (undiscovered):

There is moderate potential for epithermal gold-silver veins of the Comstock-type (quartz-adularia) in silicic dikes and domes along the margins of the Kawich caldera and in fault zones along the southwestern, northeastern, and eastern sides of the area. There is low potential for oil and gas. There is low potential for geothermal energy. There is low

potential for industrial materials.

Mining activity:

The Kawich Wilderness Study Area is included in four mining districts: Bellehelen on the north, Eden on the east, Silverbow on the south, and Golden Arrow on the west. Metal production from these districts was primarily silver and gold. The South Star mine, in the WSA, has recorded production of 531 oz of silver. U.S. Bureau of Mines MILS records show 11 precious metal producing mines on or near the area boundary.

July 1989 BLM mining claim records show 255 lode claims located in the Kawich Wilderness Study Area. Oil and gas leases cover a portion of the east, west, and north parts of the area (U.S. Bureau of Land Management, 1987).

Mineral setting:

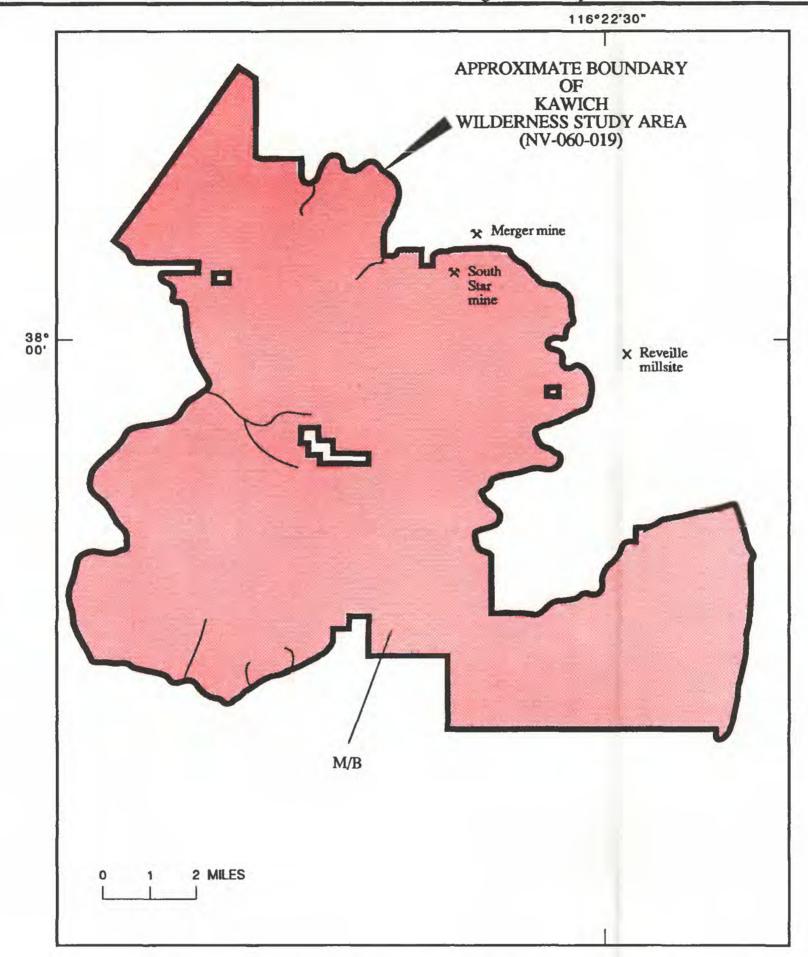
The entire area is underlain by Tertiary volcanic rocks that are locally covered by Quaternary alluvium. Most of the area is covered by late Oligocene intracaldera ash-flow tuffs from the Kawich caldera. These tuffs are intruded by silicic domes and dikes and locally overlain by andesite lavas. The eastern part of the area is covered by alluvium.

Recommendations:

Geologic mapping and geochemical sampling of mineralized structures along the edges of the area need to be undertaken to determine if mineralization extends into the area. The Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey. A mineral survey is particularly important due to the persistent mineral exploration interest in this area and the lack of specific information about known prospects and mineralized structures in the area.

References:

- Cornwall, H.R., 1972, Geology and mineral deposits of southern Nye County, Nevada: Nevada Bureau of Mines and Geology Bulletin 77, 49 p.
- Couch, B.F., and Carpenter, J.A., 1943, Nevada's metal and mineral production (1859-1940): University of Nevada Bulletin, v. 37, no. 4, 159 p.
- Gardner, J.N., Eddy, A.C., Goff, F.E., and Grafft, K.S., 1980, Reconnaissance geologic map of the northern Kawich & southern Reveille Ranges, Nye County, Nevada: University of California, Los Alamos Scientific Laboratory, Map LA-8390-Map, scale 1:62,500.
- Kleinhampl, F.J., and Ziony, J.I., 1984, Mineral resources of Northern Nye County, Nevada: Nevada Bureau of Mines and Geology Bulletin 99B, 243 p.
- Kral, V.E., 1951, Mineral resources of Nye County, Nevada: University of Nevada Bulletin, v. 45, no. 3, 223 p.
- U.S. Bureau of Land Management, 1987, Final Environmental Impact Statement, wilderness recommendations for the Tonopah Resource Area, Nevada, 333 p.



EXPLANATION

M/B Geologic terrane having moderate mineral resource potential for gold and silver with certainty level B

Mineral resources of the Kawich Wilderness Study Area.

La Madre Mountains

Area number:

NV-050-412

Size (acres):

61,630 of which 34,010 were studied at the request of the U.S. Bureau of

Land Management.

Status of

mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of

Mines (Conrad and others, 1986).

Identified mineral resources (known):

There are no identified resources within the area studied. The White Beauty mine north of the WSA contains (from owner estimation) gypsum reserves totalling 14 million tons and inferred resources of 22 million

tons.

Mineral resource potential (undiscovered): Two prospects were located and examined within the study area; these have traces of copper, and sporadic high grade blebs containing silver, lead, and zinc. These prospects and the surrounding area have low mineral resource potential for silver, lead, and zinc. Field studies did not reveal any evidence of potential for gypsum resources in the study area.

There is low potential for oil and gas resources.

Mining activity: There are no active mines within the WSA. July 1989 BLM mining

records show 26 active and 89 inactive claims in or near the WSA.

Mineral setting:

The area is underlain by a sequence of marine limestones and dolomites of Cambrian to Permian age (see geologic time chart), and mostly subearial sandstone and siltstone deposits of Triassic and Jurassic age. Northwest-trending high-angle faults, large scale thrust faults, and associated folds have greatly disrupted these strata, placing Cambrian

dolomite on top of Jurassic sandstone in some places.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work

is needed to assess the 27,620 acres that constitute the balance.

References:

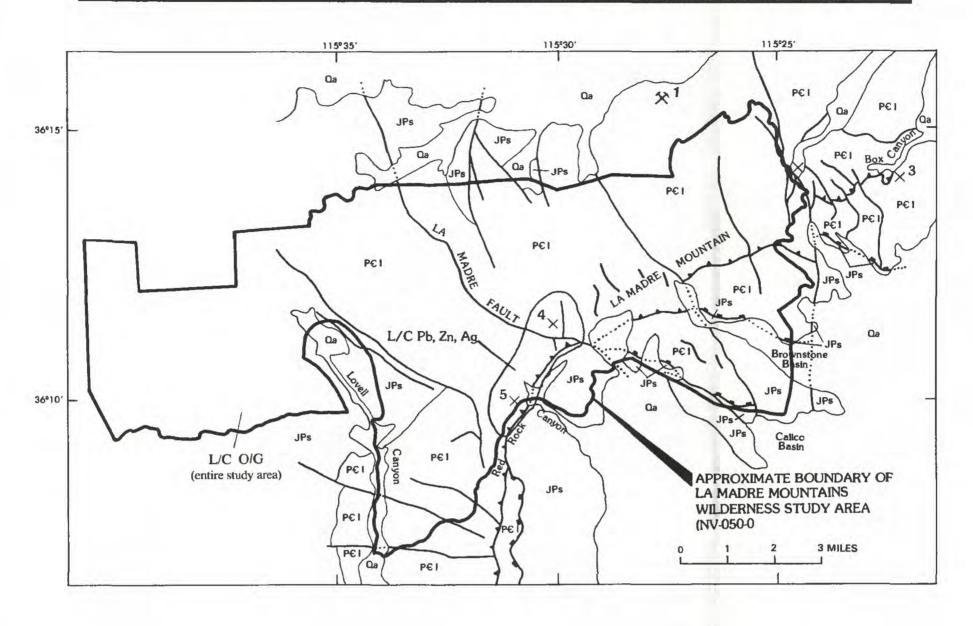
Conrad, J.E., Barton, H.N., and Lipton, D.A., 1986, Mineral resources of the La Madre Mountains Wilderness Study Area, Clark County,

Nevada: U.S. Geological Survey Bulletin 1730-A, 9 p.

Great Basin GEM Joint Venture, 1983, La Madre Mountains/Pine Creek G-E-M Resources Area (GRA No. NV.-32) Technical Report (WSAs NV-050-0412 and 050-0414): Prepared for the U.S Bureau of Land Management (contract YA-554-RFP2-1054): 34 p.

Lipton, D.A., 1985, Mineral Resources of the La Madre Mountains Study Area, Clark County, Nevada: U.S. Bureau of Mines Open File Report MLA 41-85, 14 p.

Nevada Mining Association, 1988, Nevada BLM Wilderness Study Areas, Mineral Potential Handbook: unpublished report.



Mineral resources of the La Madre Mountains Wilderness Study Area.

EXPLANATION

	Area with low resource potential; see Appendix 1 for explanation of resource potential and certainty levels
×1	Mine with identified resources; number refers to Table 1
× ²	Prospect; number refers to Table 1
COMMOD	ITIES
Ag silver Pb lead Zn zinc	
MINES AN	ND PROSPECTS
 Karen F Iron Ag Emerald 	Beauty mine Placer prospect te prospect if prospect in View prospect
CORRELA	ATION OF MAP UNITS
Qa	- Quaternary - CENOZOIC
JPs	Jurassic to Permian - MESOZOIC
P€I	Permian to PALEOZOIC Cambrian
GEOLOGI	C MAP UNITS
Qa	Alluvium (Quaternary)
JPs	Sandstone, siltstone, and minor limestone (Jurassic to Permian)
P€I	Limestone, dolomite, and cherty dolomite (Permian to Cambrian)
MAP SYM	BOLS
	CONTACT
	FAULT-Dotted where concealed
	KEYSTONE THRUST FAULTSawteeth on upper plate; dotted where concealed
	RED SPRING THRUST FAULTBoxes on upper plate; dotted where concealed

Explanation, mineral resources of the La Madre Mountains Wilderness Study Area.

Area number: Size (acres): Lime Canyon NV-050-231 34,680



Status of mineral surveys:

The Wilderness Study Area has been studied as part of mineral surveys by the U.S. Bureau of Mines and the U.S. Geological Survey (Evans and others, 1990).

Identified mineral resources (known):

There are an estimated 44 million tons indicated subeconomic gypsum resources. About 16 square miles of the WSA are underlain by an inferred subeconomic sand and gravel resource. Limestone and dolostone occur over 20 square miles and are classified as an inferred subeconomic resource.

Mineral resource potential (undiscovered):

The Lime Canyon study area has low resource potential for barium in bedded barite deposits in two large areas and two small areas underlain by Paleozoic, Mesozoic, and Miocene sedimentary rocks. Three small areas in the east, north, and west parts of the study area have low potential for both gold and barium. There is a low resource potential for silver in the south-central part of the wilderness in two areas underlain by altered Proterozoic and younger carbonate rocks. There is also a low potential for both gold and silver in the south-central part of the study area in an area underlain by Proterozoic rocks. Based on exploratory drilling and nearby oil and gas shows, the area is judged to have low resource potential for oil and gas in areas underlain by Paleozoic, Mesozoic, and Miocene sedimentary rocks (Sandberg, 1983). No potential was identified for geothermal resources (Evans and others, 1990).

Mining activity:

The Wilderness Study Area is in the Gold Butte mining district. Mining of mica began in 1873 outside the study area. At least 6.25 tons of sheet mica were shipped. Later, ultramafic rocks in the vicinity were mined for vermiculite.

Metal mining began about 1905 with discovery of gold in veins in the metamorphic and granitic rocks south of Gold Butte, outside the study area. In 1907, replacement deposits of silver-bearing copper and zinc ore were found in Paleozoic limestone north of Gold Butte and east of the study area. Small shipments of copper and zinc ore were reported (Longwell, and others, 1965, p. 126).

Since 1918 gold-bearing quartz veins in granitic rocks have produced less than 2,857 troy ounces of gold (Longwell, 1965, p. 128 and Couch and Carpenter, 1943). One of these gold properties, outside the study area, was in small-scale operation in 1987.

In the WSA, 1987 examinations revealed:

a) Three shafts, one adit and other minor workings in carbonates and redbeds.

- b) Seven patented gypsum claims and two unpatented mineral surveys.
- c) Numerous uranium exploration trenches in Tertiary sediments.
- d) Current gold claims with minor workings in alluvium adjacent to the site of the mining camp of Gold Butte.

July 1989 BLM records show approximately ten lode and nine placer mining claim locations active in or adjacent to the WSA, all near the site of the mining camp of Gold Butte. In March 1987, 37 percent of the study area was covered by oil and gas leases.

Mineral setting:

The Lime Canyon study area is underlain by Proterozoic gneiss and granitic rocks. These are overlain by a thick section of Paleozoic and Mesozoic sedimentary rocks that include limestone, dolomite, sandstone, and gypsum. These are in turn overlain by Tertiary sediments that include fanglomerate and gypsiferous sandstone and siltstone. Younger alluvium is found in drainages and over the lower slopes of the area (Evans and others, 1990).

Recommendations: Drilling is required to evaluate gypsum resources. Additional surface sampling, mapping, and drilling are necessary to evaluate the limestone and dolostone. Broad magnetic anomalies over the study area (Aero Service Division, 1979) may indicate underlying igneous and sedimentary rocks at shallow depths and should be considered during an evaluation of the area as these igneous and metamorphic rocks are mineralized in the vicinity; replacement deposits in carbonates near igneous rocks may occur.

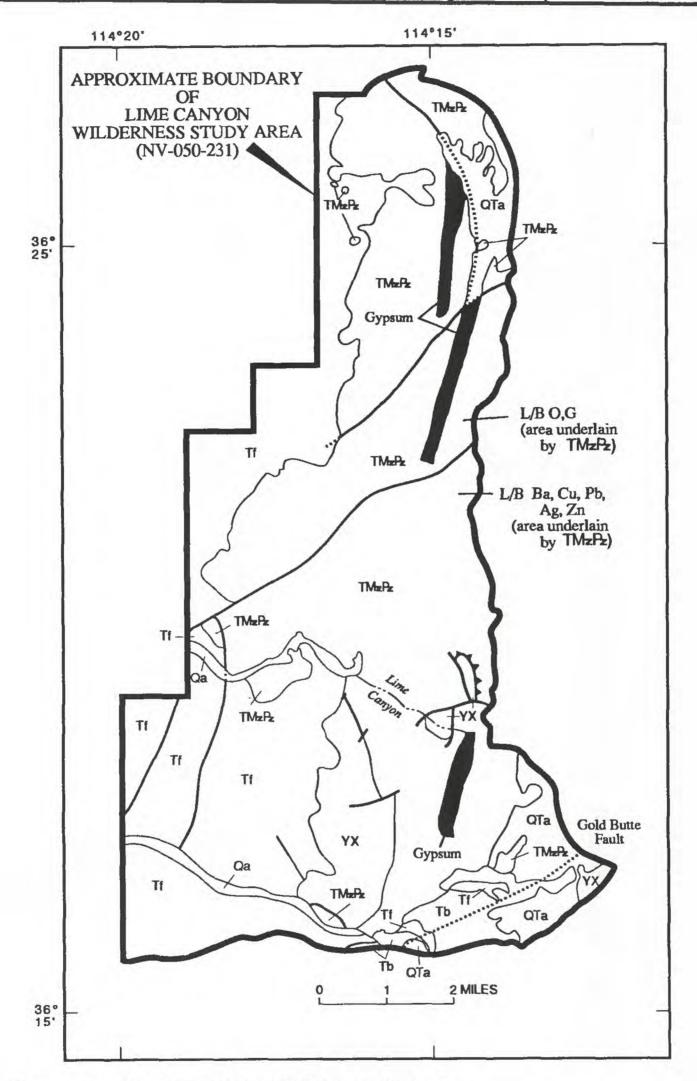
References:

Aero Service Division, 1979, Airborne Gamma-Ray Spectrometer and magnetometer survey, Las Vegas Quadrangle (Arizona, California, Nevada), Williams Quadrangle (Arizona), Prescott Quadrangle (Arizona), and Kingman Quadrangle (Arizona, California, Nevada), Final Report, volumes I and II: Houston, Tx, Western Geophysical Company of America, for U.S. Department of Energy, Open-File report GJBX 59(79).

Bureau of Land Management, 1988, Draft environmental impact statement, Preliminary wilderness recommendations for Nevada contiguous lands: Department of Interior, Bureau of Land Management, Ely, Las Vegas, and Winnemucca Districts, 291 p, unpaginated section of maps.

Cook, J.R., and Fay, W.M., 1982, Data report: western United States, National Uranium Resource Evaluation Program, hydrogeochemical and stream sediment reconnaissance: Aiken, SC, E.I. du Pont de Nemours and Company, Savannah River Laboratory, for U.S. Department of Energy, Open-File report GJBX 132(82), 33 p.

- Couch, B.F., and Carpenter, J.A., 1943, Nevada's metal and mineral production (1859-1940, inclusive): Nevada Bureau of Mines and Geology Bulletin 38, No. 4, 159 p.
- Evans, J.G, Nowlan, G.A., and Winters, R.A., 1990, Mineral resources of the Lime Canyon Wilderness Study Area, Clark County, Nevada: U.S. Geological Survey Bulletin 1730-D.
- Great Basin GEM Joint Venture, 1983, Lake Mead G-E-M Resources Area (GRA NO. NV-35) Technical Report (WSA's NV 050-0231, 050-0233, 050-0235, 050-0236, and 050-0238): Prepared for the U.S. Bureau of Land Management, 39 p.
- Longwell, C.R., Pampeyan, E.H., Bowyer, Ben, and Roberts, R.J., 1965, Geology and mineral deposits of Clark County, Nevada: Nevada Bureau of Mines Bulletin 62, 218 p.
- Morgan, J.R., 1968, Structure and stratigraphy of the northern part of the South Virgin Mountains, Clark County, Nevada: Albuquerque, University of New Mexico, Masters thesis, 103 p.
- Murphy, T.D., 1954, Silica resources of Clark County, Nevada: Nevada Bureau of Mines Bulletin 55, 33 p.
- Nevada Mining Association, 1988, Nevada BLM wilderness study areas mineral potential handbook: Nevada Mining Association, One East First Street, Reno, NV.
- Qualheim, B.J., 1978, Hydrogeochemical and stream sediment reconnaissance basic data report for Las Vegas NTMS Quadrangle, Arizona, California, and Nevada: Livermore, CA, Lawrence Livermore Laboratory, for U.S. Department of Energy, Open-File report GJBX-123(78), 42 p. plus two appendixes.
- Sandberg, C.A., 1983, Petroleum potential of wilderness lands in Nevada: U.S. Geological Survey Circular 902-H, 11 p.
- Vanderburg, W.O., 1936, Placer Mining in Nevada: Nevada Bureau of Mines and Geology Bulletin 27, 180 p.
- Vanderburg, W.O., 1937, Reconnaissance of mining districts in Clark County, Nevada: U.S. Bureau of Mines Information Circular 6964, 81 p.
- Winters, R.A., 1988, Mineral resources of the Lime Canyon Wilderness Study Area, Clark County, Nevada: U.S. Bureau of Mines Open-File Report MLA 40-88, 42 p.



Mineral resources of the Lime Canyon Wilderness Study Area.

	EXPLANATION
	Area of low mineral resource potential (L)
	Levels of certainty of assessment
В	Data only suggest level of potential
C	Data clearly define level of potential
	Commodities
Ag	Silver
Au	Gold
Ba	Barium
Cu	Copper
Pb	Lead
Zn	Zinc
O,G	Oil and gas
	Identified resources
	Indicated resources of gypsum—See text for discussion
	Geologic map units
Qa	Alluvium (Quaternary)
QTa	Older alluvium (Quaternary and Pliocene)
Tf	Fanglomerate (Pliocene)
Tb	Basalt (Pliocene)
TMzPz	Sedimentary rocks (Miocene, Mesozoic, and Paleozoic)
YX	Granitoid and gneiss (Middle and Early Proterozoic)
	Contact
	Fault—Dotted where concealed
***	Thrust fault—Sawteeth on upper plate

Explanation, mineral resources of the Lime Canyon Wilderness Study Area.

Area number:

Size (acres):

Little High Rock Canyon CA-020-913/NV-020-008

50,951 of which 17,320 were studied at the

request of the U.S. Bureau of Land

Management.

Status of

mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Keith and others,

1987).

Identified mineral resources (known):

No mineral resources have been identified in the wilderness study area, but 2 million tons of subeconomic perlite, and over 28 million tons of subeconomic pozzolanic sediments occur within and adjacent to the WSA.

Mineral resource potential

(undiscovered):

The results of studies suggest three areas with moderate resource potential for gold and silver in epithermal deposits in the northwestern, central, and southern parts of the area. Elsewhere within the study area, the potential for these resources is low. Two small areas in the southeastern part of the study area have low potential for uranium resources; one small area has low potential for pozzolan resources, and one area has low potential for perlite resources. Potential for geothermal resources is low in the entire study ares.

Mining activity: The Hog Ranch gold mine lies southwest of the WSA and the Jabo epithermal gold prospect is within WSA. There are between 500 and 750 active claims in or near the WSA. The claims extend from the Hog Ranch mine, southwest of the WSA, or are part of the Jabo prospect in the south central part of the WSA.

Mineral setting:

The study area is underlain by a sequence of lava flows and pyroclastic deposits that overlie and interfinger with lake and stream sediments; all are of Miocene age. These volcanic and sedimentary rocks are faulted and locally altered.

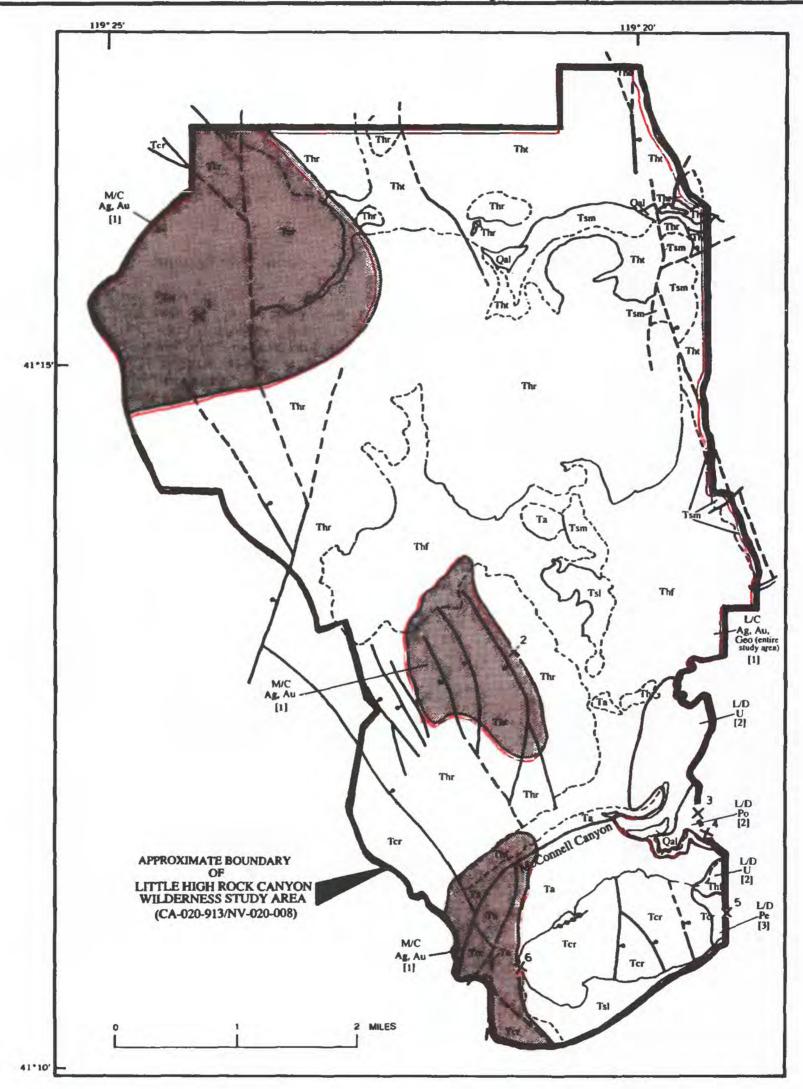
Recommendations:

As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 33,631 acres that constitute the balance. The structural lineament hosting the gold extends into the wilderness study area. A comprehensive study of this structure is recommended.

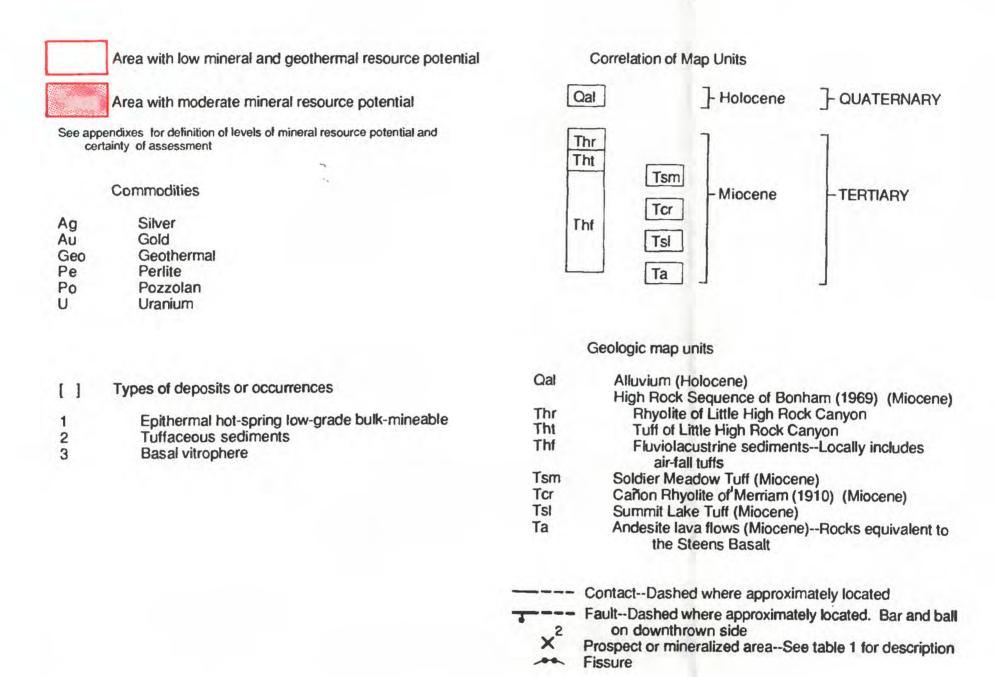
References:

Bonham, J.F., 1969, Geology and mineral deposits of Washoe and Storey Counties, Nevada, with a section on industrial mineral deposits by K. G. Papke: Nevada Bureau of Mines and Geology Bulletin 70, 140 p.

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- Nevada Mining Association, 1988, Nevada BLM Wilderness Study Areas, Mineral Potential Handbook: Reno, Nevada, unnumbered pages.
- Peters, T.J., Munts, S.R., and Miller, M.S., 1987, Mineral resources of the Little High Rock Canyon study area, Humboldt and Washoe Counties, Nevada: U.S. Bureau of Mines Open-File Report MLA 16-87, 39 p.
- U.S. Bureau of Land Management, 1984, Eagle Lake/Cedarville study areas Draft Environmental Impact Statement: U.S. Bureau of Land Management, Susanville (CA) District Office, 340 p.



Mineral resources of the Little High Rock Canyon Wilderness Study Area.



Explanation, mineral resources of the Little High Rock Canyon Wilderness Study Area.

Little Humboldt River

Area number:

NV-010-132

Size (acres):

42,213 of which 40,000 were studied at the request of the U.S. Bureau of

Land Management.

Status of

mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of

Mines (Wallace and others, 1988).

Identified mineral resources (known):

No mineral resources have been identified in the Wilderness Study Area. Within one-half mi north of the WSA a 20-ft-thick diatomaceous bed crops out containing 60-85 percent diatoms. This bed is estimated to contain 43,000 tons of diatomaceous material, but not of sufficient

quality to compete with material presently marketed.

Mineral resource potential (undiscovered):

Parts of the area have a high, medium, or low mineral resource potential for disseminated gold deposits and zeolites. Some areas have an unknown mineral resource potential for bedded barite and disseminated gold in rocks beneath the volcanic cover. The entire study area has a low resource potential for uranium and thorium, diatomite, tin, arsenic, antimony, silver, and mercury, oil and gas, geothermal energy, and sand

and gravel.

Mining activity:

There is no known mineral production within the WSA. The Gold Circle mining district encompassing the south end of the area produced about 127,000 oz gold and 1.6 million oz silver from 132,000 tons of ore from an area about 6 mi south of the WSA. The Paradise tungsten prospect lies 2 mi south of the study area. Numerous mining companies are conducting exploration on the south, east, and west sides of the WSA.

July 1989 BLM records show approximately 550 active mining claims in the WSA. The southern half of the WSA is covered by oil and gas leases.

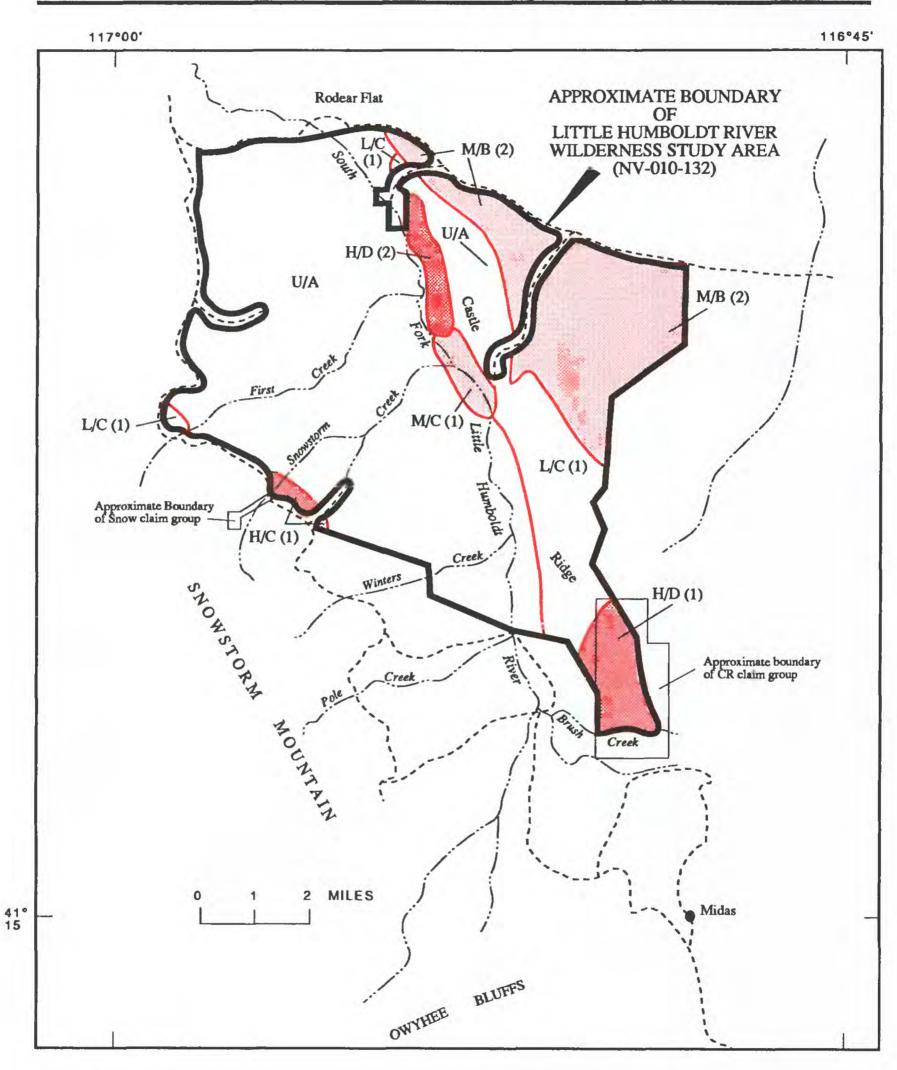
Mineral setting:

The wilderness study area is underlain by a complex, interlayered sequence of volcanic rocks that were erupted between about 10 and 15 m.y. (million years) ago. The oldest rocks are rhyolitic flows and tuffs and lesser amounts of ash-rich sedimentary rocks and andesitic flows, dikes, and tuffs. These rocks were cut by steep faults that produced a large, north-trending basin. Ash-flow tuffs were erupted into this basin as it developed, forming the widespread tuff of the Little Humboldt River. Subsequently, widespread shallow lakes covered surrounding areas, and large volumes of crystal-rich rhyolitic flows were erupted just west of the wilderness study area. About 10 m.y. age, basalt flows were erupted near the northeastern edge of the study area. Active faulting during volcanic activity produced a complex relation between volcanic units and various fault systems.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 2,213 acres that constitute the balance.

References:

- Gabby, P.N., 1986, Mineral resources of the Little Humboldt River study area, Elko County, Nevada: U.S. Bureau of Mines Open-File Report MLA 23-87, 27 p.
- Granger, A.E., Bell, M.N., Simmons, G.C., and Lee, Florence, 1957, Geology and mineral resources of Elko County, Nevada: Nevada Bureau of Mines and Geology Bulletin 54, 190 p.
- Smith, R.M., 1976, Mineral resources of Elko County, Nevada: U.S. Geological Survey Open-File Report 76-56, p. 73-74.
- Wallace, A.R., Turner, R.L., Grauch, V.J.S., Plesha, J.L., Krohn, M.D., Duval, J.S., and Gabby, P.N., 1988, Mineral resources of the Little Humboldt River Wilderness Study Area, Elko County, Nevada: U.S. Geological Survey Bulletin 1732-B, 20 p.



Mineral resources of the Little Humboldt River Wilderness Study Area.

[Except for parts of study area designated below as having high or moderate potential for commodity 2, the study area has a low mineral resource potential for commodity 2 (certainty level D). Entire study area has a low mineral resource potential for tin, uranium and thorium, sand and gravel and oil and gas (certainty level D) and for arsenic, antimony, mercury, silver, geothermal energy, and diatomite (certainty level C)]

H/C,D	Geologic terrane having a high mineral resource potential for commodity 1 (certainty level C or D) or for commodity 2 (certainty level D)—Commodity shown on figure by number in parentheses
M/B,C	Geologic terrane having a moderate mineral resource potential for commodity 1 (certainty level C) or for commodity 2 (certainty level B)—Commodity shown on figure by number in parentheses
L/C	Geologic terrane having a low mineral resource potential for commodity 1 (certainty level C)—Commodity shown on figure by number in parentheses
U/A	Geologic terrane having an unknown mineral resource potential for commodity 1 (applies to all parts of study area not designated as having high, moderate, or low potential for commodity (1) and (or) for commodity 3 (applies to entire study area)
	Commodities:
1.	Disseminated gold
2.	Zeolites
3.	Barlite
	Levels of certainty
Α	Available data not adequate to determine resource potential
В	Data indicate geologic environment and suggest level of resource potential
C	Data indicate geologic environment, give good indication of level of resource potential, but do not establish activity pf

Explanation, mineral resources of the Little Humboldt River Wilderness Study Area.

potential

D

resource-forming processes

Data clearly define geologic environment and level of resource

Marble Canyon (Granite Springs)

Area number:

NV-040-086

Size (acres):

12,715 of which 8,300 were studied at the request of the U.S. Bureau of

Land Management.

Status of mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Diggles and others, 1990)

Identified mineral resources (known):

Large inferred subeconomic limestone and marble resources inside the study area are without special or unique properties. The carbonate rocks are suitable for use in aggregate, but there are no nearby markets and similar quality resources are present elsewhere.

Mineral resource potential (undiscovered):

The lower part of Bars Canyon has high mineral resource potential for limestone and marble. The rest of the wilderness study area has moderate mineral resource potential for marble. The parts of the Marble Canyon Wilderness Study Area underlain by the upper plate of the northern Snake Range décollement have low mineral resource potential for gold and silver associated with low-angle faults. The parts of the study area where the décollement is still present and extending east and south to the Mount Moriah Roadless Area have low potential for copper, lead, and zinc. Areas underlain by exposures of the décollement and upper-plate rocks have low mineral resource potential for tungsten and molybdenum. The geophysical study suggests that no plutons are buried beneath the study area, but anomalous concentrations of beryllium in geochemical samples collected from the study area could be explained by the presence of a buried pluton. Areas having exposures of the décollement and rocks overlying the fault have low mineral resource potential for beryllium and fluorite. The adits inside the southeastern boundary of the study area contain barite and anomalous concentrations of barium were measured in geochemical samples from upper-plate rocks. The zone around the adits has moderate mineral resource potential for barite; the surrounding area has low mineral resource potential for barite. On the basis of geochemical data, the zone around the adit and the surrounding area have low mineral resource potential for silver, copper, lead, zinc, and tungsten. The metamorphosed lower plate rocks, thin sequences of faulted upper plate rocks, and extrusive volcanic rocks exposed in the study area are not conducive to the accumulation of hydrocarbons; however, suitable source rocks are present. The resource potential for oil and gas in the entire study area is moderate. There are two thermal springs in Spring Valley to west of the study area and thermal springs just east of the study area. Range-front faults may provide a conduit for the circulation of thermal water and the system could extend into the study area. The entire Marble Canyon Wilderness Study Area has low potential for geothermal energy resources associated with lowtemperature thermal springs.

Mining activity:

The Marble Canyon mining district near the northern boundary encompasses the Marble Wash area. Prospecting and limestone quarrying have taken place in the study area. Marble claims were first located in 1891. Two short adits are located inside the southwestern boundary. Breccia zones, not traceable beyond the workings, contained some pathfinder elements typical of detachment fault-related deposits.

Mineral setting:

The area is underlain by shales and carbonate rocks of early Paleozoic age. The oldest rocks in the area are metamorphosed marble and phyllite of Early and Middle Cambrian age. Shale of Late Cambrian age has been faulted over the metamorphosed rocks. Dolomite, shale, and quartzite of Ordovician and Silurian age are also in fault contact with the Upper Cambrian rocks. The structural history of the study area includes the development of a detachment fault that juxtaposes metamorphosed Paleozoic rocks beneath, and in flat-fault contact with lessmetamorphosed to nonmetamorphosed rocks. This detachment fault is called the northern Snake Range décollement.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 4,415 acres that constitute the balance.

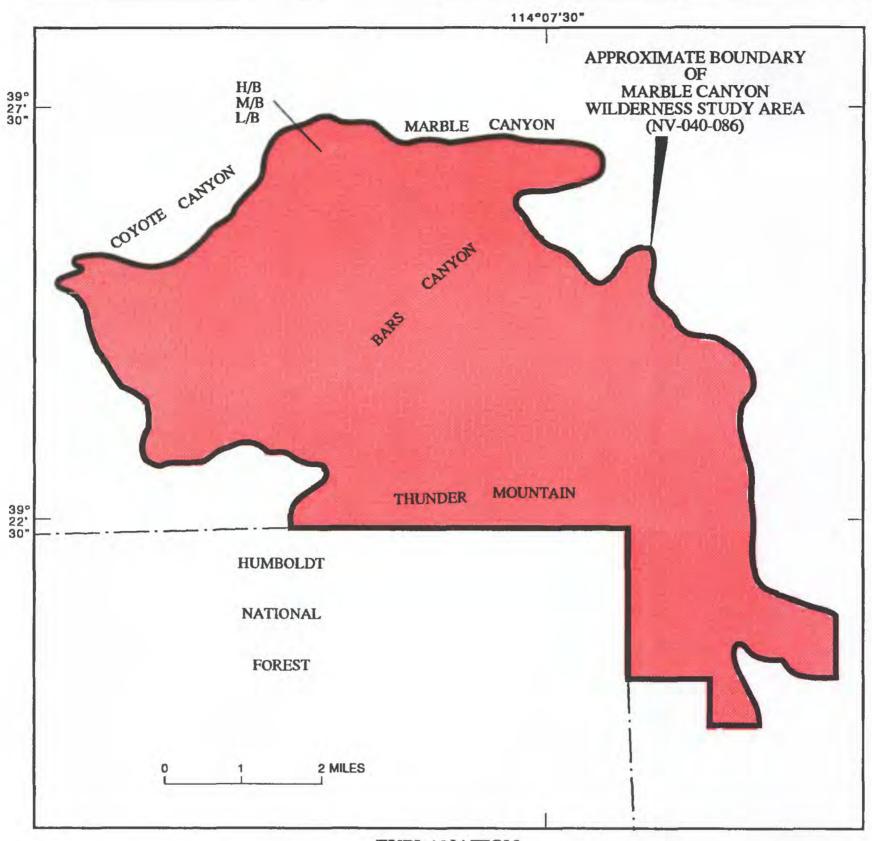
References:

Darton, N.H., 1908, Marble of White Pine county, Nevada, near Gandy, Utah: U.S. Geological Survey Bulletin 340 G, p. 377-380.

Diggles, M.F., Nowlan, G.A., Blank, R.H., Jr., Marcus, S.M., and Kness, R.F., 1990, Mineral resources of the Marble Canyon Wilderness Study Area, White Pine County, Nevada, and Millard County, Utah: U.S. Geological Survey Bulletin 1728.

Hose, R.K., Blake, M.C., and Smith, R.M., 1976, Geology and mineral resources of White Pine County, Nevada: Nevada Bureau of Mines and Geology Bulletin 85, 105 p.

Kness, R.F., 1989, Mineral investigation of the Marble Canyon Wilderness Study Area (NV-040-086) White Pine County, Nevada, and Millard County, Utah: U.S. Bureau of Mines Open-File Report MLA 17-89, 22 p.



EXPLANATION

- H/B Geologic terrane having high mineral resource potential for limestone and marble with certainty level B
- M/B Geologic terrane having moderate mineral resource potential for marble and barite with certainty level B
- L/B Geologic terrane having low mineral resource potential for gold, silver, copper, lead, zinc, tungsten, molybdenum, beryllium, fluorite, barium, oil and gas, and geothermal energy with certainty level B

Mineral resources of the Marble Canyon (Granite Springs) Wilderness Study Area.

Area number:

Massacre Rim CA-020-1013

Size (acres):

101,290 of which 23,260 were studied at the request of the U.S. Bureau of Land Management.

Status of

mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Bergquist and others, 1988).

Identified mineral resources (known):

There are no identified mineral resources in the wilderness study area.

Mineral resource potential (undiscovered):

There is moderate mineral resource potential for gold, silver, and mercury in hydrothermal deposits in the eastern part of the study area. There is moderate mineral resource potential for uranium throughout the study area. There is no potential for oil and gas in the study area. The potential for geothermal resources is unknown.

Mining activity:

There has been no known prospecting activity or mineral production from the wilderness study area. The wilderness study area is not part of any organized mining district and there are no current mining claims according to October, 1988, U.S. Bureau of Land Management records.

Mineral setting:

The study area is underlain mostly by basalt flows of Miocene age. The basalt mostly covers older Tertiary rhyolite and tuffaceous alluvial and lake deposits of Tertiary to Holocene age. In many places in the region the basalt has been eroded, exposing the underlying older rocks and tuffaceous sediments. Because the tuffaceous sediments which underlie the basalt flows are relatively incompetent, there has been extensive landsliding in the region.

Recommendations:

As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 78,030 acres that constitute the balance.

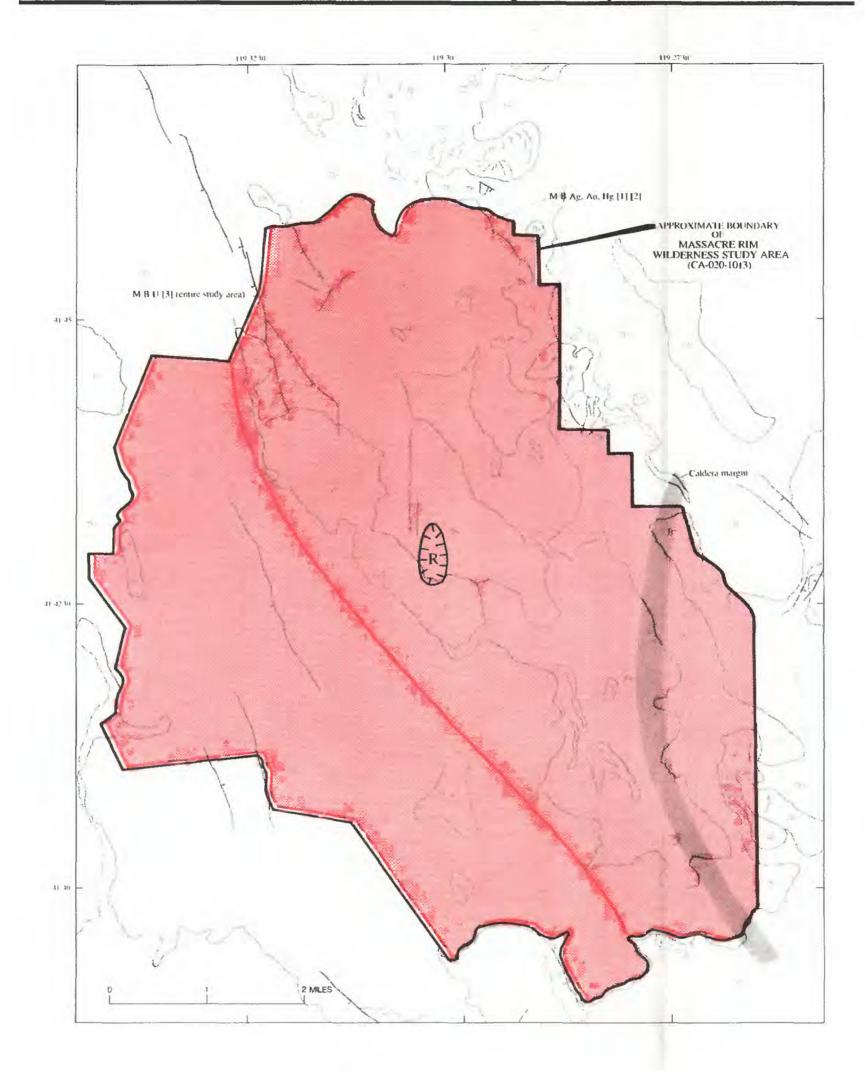
References:

Bailey, E.H., and Phoenix, D.A., 1944, Quicksilver deposits in Nevada: University of Nevada Bulletin, vol. 38, no. 5, Geology and mining series no. 41, 206 p.

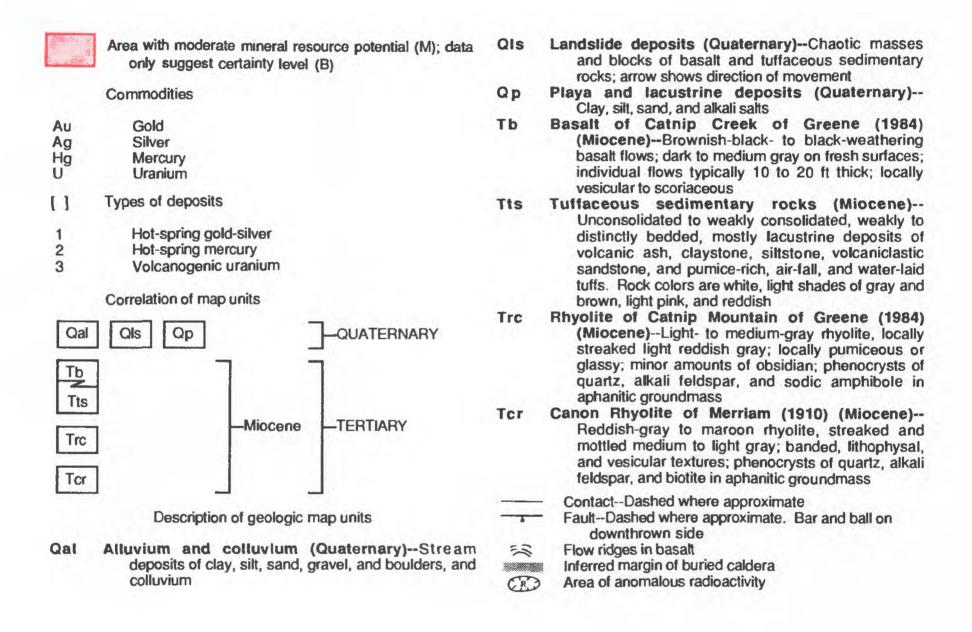
Bergquist, J.R., Plouff, Donald, Turner, R.L., and Causey, J.D., 1988, Mineral resources of the Massacre Rim Wilderness Study Area, Washoe County, Nevada: U.S. Geological Survey Bulletin 1707-E, 16 p.

Bohnam, H.F., 1969, Geology and mineral deposits of Washoe and Storey Counties, Nevada: Nevada Bureau of Mines Bulletin 70, 140 p.

- Causey, J.D., 1987, Mineral resources of the Massacre Rim study area, Washoe County, Nevada: U.S. Bureau of Mines Open-File Report MLA 9-87, 8 p.
- Ross, C.P., 1941, Some quicksilver prospects in adjacent parts of Nevada, California, and Oregon: U.S. Geological Survey Bulletin 931-B, p. 23-37.
- Rytuba, J.J., 1981, Relation of calderas to ore deposits in the western United States: Arizona Geological Society Digest, v. XIV, p. 227-236.



Mineral resources of the Massacre Rim Wilderness Study Area.



Explanation, mineral resources of the Massacre Rim Wilderness Study Area.

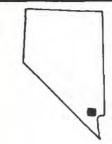
Meadow Valley Range

Area number:

NV-050-156

Size (acres):

185,744 of which 97,180 were studied at the request of the U.S. Bureau of Land Management.



Status of mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Pampeyan and others, 1988).

Identified mineral resources (known):

The Johnston and Fitchett prospect inside the study area has more than 3 million tons of indicated and inferred marginal perlite reserves (Pampeyan and others, 1988). Zeolite minerals are associated with the perlite deposits. Gypsum (Jones and Stone, 1920) and placer gold deposits (Jones and Papke, 1984) are present in the unstudied part of the area; amount of resources, if any, is unknown. Sand, gravel, and stone (quartzite and limestone) are abundant in the area, but these occurrences are not unique and other suitable deposits are closer to prospective markets.

Mineral resource potential (undiscovered):

The area surrounding the Johnson and Fitchett prospect inside the northern part of the study area has high potential for perlite and moderate potential for zeolite minerals associated with the perlite; occurrences of agate, marekanite (Apache tears), and opaline rock, all traditionally of interest to mineral collectors, also are associated with the perlite and have a moderate resource potential. The Bradshaw vanadium prospect outside the west edge of the study area has 800,000 tons of black shale containing inferred subeconomic resources of cadmium, chronium, copper, molybdenum, nickel, phosphorous, silver, vanadium, and zinc that may extend down dip into the study area. There is a high potential for vanadium west of the study area and an unknown potential for vanadium immediately east of the outcrop in the study area. In the southernmost part of the study area silicified limestone at the D and D prospect contains trace amounts of silver and the Fry and Jeffers claim is on an insignificant radioactive anomaly. There is no potential for silver at the D and D prospect and no potential for uranium or thorium at the Fry and Jeffers claim.

Heavy-mineral concentrates from stream-sediment samples in the north half of the study area suggest a moderate potential area and a separate low potential area for rhyolite-hosted tin resources and a low potential for carbonate-hosted silver, copper, lead, and zinc resources. There is low potential for carbonate-hosted gold, silver, lead, and zinc resources in the southwestern part of the study area. In the southern part of the study area, an area has low potential for carbonate-hosted copper, lead, and zinc resources. Evaporite deposits of gypsum are present adjacent to the east side of the study area but they do not extend into the area and have no resource potential there. Silica in the form of quartzite is present in the south half of the study area but has no resource potential. A small amount of ornamental stone has been quarried outside the west edge of the study area, but there is no resource potential for this stone within the area. The southern one-third of the study area has high resource potential for limestone inferred to be of high purity. The study area also has a high potential for resources of sand and gravel in the alluvial deposits. There is a moderate potential for oil and gas resources in the study area. There is no potential for geothermal resources in the study area.

Mining activity:

Placer gold was reportedly recovered in 1983 by Enoch Resources from alluvial deposits on the southeastern boundary of the area (Jones and Papke, 1984). In 1972, Texaco Inc. drilled an exploratory oil and gas well in the unstudied part of the area; the well was subsequently abandoned.

Mineral setting:

The south half of the study area is underlain by faulted folded marine sedimentary rocks of Cambrian through Triassic age (see Geologic Time Chart). Limestone and dolomite are the dominant rock types, but some shale, sandstone, and siltstone are present near the top of the sedimentary sequence. In the north half of the area these rocks are overlain by volcanic rocks of Miocene age (24 to 11 million years before present, Ma), predominantly rhyolitic welded tuffs locally interlayered with rhyolitic and basaltic flows and cut by rhyolitic dikes. The sedimentary and volcanic rocks are overlapped by Miocene to Holocene nonmarine sediments.

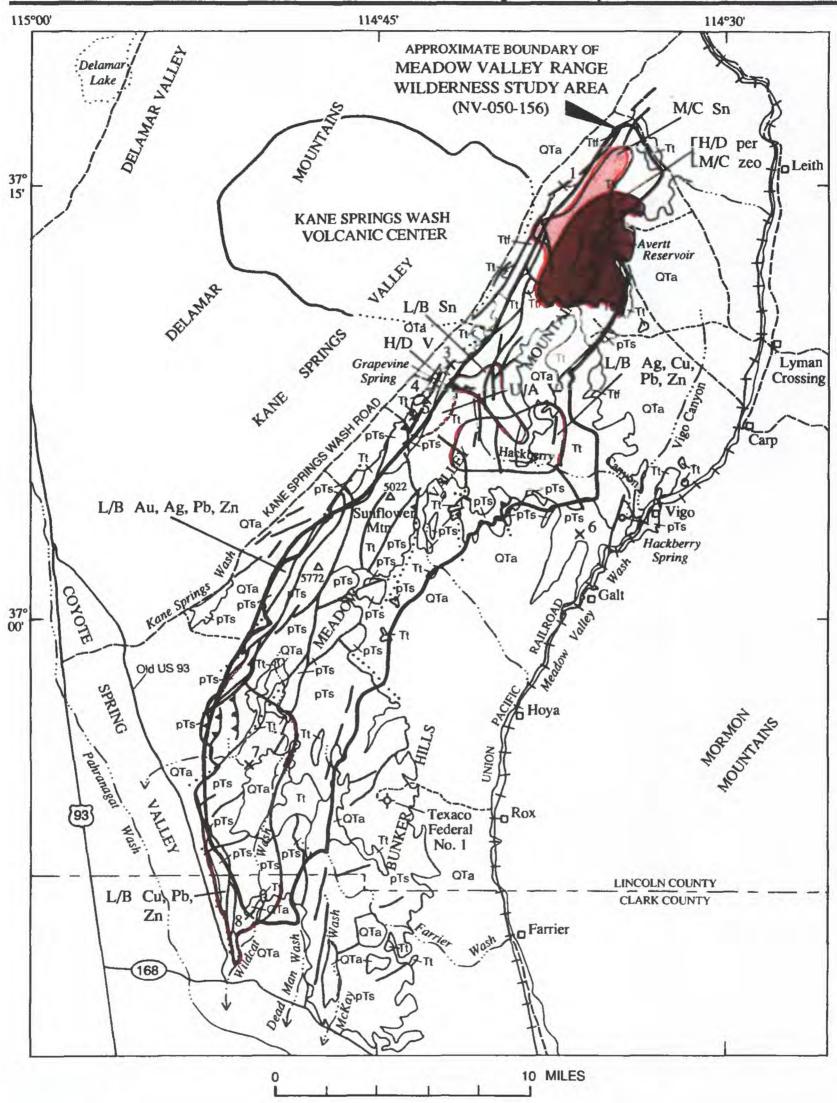
Recommendations:

As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 88,564 acres that constitute the balance. Perlite and zeolite areas should be geologically mapped in detail and sampled at close intervals to delineate total resources. This work should be complemented with selective drilling. Known gypsum and placer gold deposits in the unstudied area should be evaluated.

References

- Campbell, H.W., 1987, Mineral resources of the Meadow Valley Range study area, Lincoln and Clark Counties, Nevada: U.S. Bureau of Mines Open File Report MLA 27-87, 27 p.
- Heston, D.A., 1982, Geology of the Bradshaw vanadium prospect, Meadow Valley Mountains, Lincoln County, Nevada: Fort Collins, CO, Colorado State University, M.S. thesis, 106 p.
- Jones, J.C., and Stone, R.W., 1920, (Deposits in) Southern Nevada, in Stone, R.W., and others, Gypsum deposits of the United States: U.S. Geological Survey Bulletin 697, p. 155-160.
- Jones, R.B. and Papke, K.G., 1984, Active mines and oil fields in Nevada--1983: Nevada Bureau of Mines and Geology, Map 84, scale 1:1,000,000.

- Longwell, C.R., Pampeyan, E.H., Bowyer, Ben, and Roberts, R.J., 1965, Geology and mineral deposits of Clark County, Nevada: Nevada Bureau of Mines Bulletin 62, 218 p.
- Pampeyan, E.H., Blank, H.R., Jr., and Campbell, H.W., 1988, Mineral resources of the Meadow Valley Range Wilderness Study Area, Lincoln and Clark Counties, Nevada: U.S. Geological Survey Bulletin 1729-C, 24 p.
- Tschanz, C.M., and Pampeyan, E.H., 1970, Geology and mineral deposits of Lincoln County, Nevada: Nevada Bureau of Mines Bulletin 73, 187 p.



Mineral resources of the Meadow Valley Range Wilderness Study Area.

	Area with high mineral resource potential
	Area with moderate mineral resource potential
	Area with low mineral resource potential
	Area with unknown mineral resource potential
2×	Prospect with identified resource—See table 1 for description

See appendixes for definition of levels of mineral resource potential (L, M, H, U) and level of assessment (A, B, C, D)

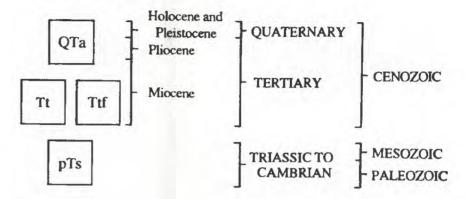
Commodities

Cu	Copper
Au	Gold
Pb	Lead
Ag	Silver
Sn	Tin
V	Vanadium
Zn	Zinc
per	Perlite
zeo	Zeolites, agate, marekanite (Apache tears), opaline rock

6× Quarry, prospect, or claim

- 1. Sunshine prospect
- 2. Johnston and Fitchett prospect
- 3 Unnamed prospect
- 4. Bradshaw prospect
- 5. Wonder Rock quarry
- 6. Robb prospect
- 7. D and D prospect
- 8. Fry and Jeffers claim

Correlation of map units



Description of map units

Qta	Alluvial and lacustrine deposits (Holocene to Miocene)
Tt	Dacitic to rhyolitic welded tuffs with some interlayered rhyolitic and basaltic flows (Miocene)
Ttf	Interlayered rhyolitic welded tuffs and rhyolitic flows (Miocene)—Includes some rhyolitic dikes
pTs	Sedimentary rocks (pre-Tertiary)—Includes Cambrian to Triassic limestone and dolomite with minor amounts of shale, sandstone, and siltstone
	- Contact
	- Fault—Dotted where concealed
***	 Thrust fault—Dotted where concealed; sawteeth on upper plate
	- Paved road
	- Graded gravel road
	- Unimproved road or jeep trail
5022	Elevation—In feet
*	Oil test well

Explanation, mineral resources of the Meadow Valley Range Wilderness Study Area.

Million Hills NV-050-233

Area number: Size (acres):

21,296 of which 9,599 were studied at the request of the U.S. Bureau of

Land Management.

Status of

mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of

Mines (Bergquist and others, 1990)

Identified mineral resources (known):

There are inferred subeconomic resources of copper, lead, zinc, cobalt, gold, and silver at the Quartz claim in the northwest part of the study area. The Azure Ridge mine, located on the northwest boundary of the study area, contains inferred subeconomic resources of copper, lead,

zinc, and lesser amounts of cobalt, gold, and silver.

Mineral resource potential (undiscovered): The study area is considered to have high potential for copper, lead, zinc, cobalt, gold, silver, germanium, and gallium in Kipushi-type deposits similar to the Apex mine near St. George, Utah. The Apex mine, which is currently being mined for germanium and gallium, and the Azure Ridge mine in the study area are in a similar setting with respect to host rocks and structure. The Apex mine is hosted in the Callville Limestone, a stratigraphic unit that is present in the study area, and the ore occurs along steeply dipping faults. The mineralization at the Azure Ridge mine is likewise localized along steeply dipping faults. The geochemical signature obtained from samples of sediment taken from the study area correlates well with the Kipushi copper-lead-zinc ore deposit model.

The study area has low potential for petroleum based upon the possible presence of source rocks, reservoir rocks, and favorable areas to the north that are covered by oil and gas leases. As of 1988, there were 6 oil

and gas leases in and near the study area.

Mining activity:

The study area is on the east edge of the Gold Butte mining district in the South Virgin Mountains. The Azure Ridge mine in the study area was active in 1918; two carloads of hand sorted zinc ore averaging 40% zinc and one carload of copper ore averaging 35% copper were shipped from the mine. The property is now covered by actively maintained claims. In 1907, argentiferous copper and zinc ores were discovered in Paleozoic limestone, and three mines (one of which is in the study area) produced about \$100,000 of metal.

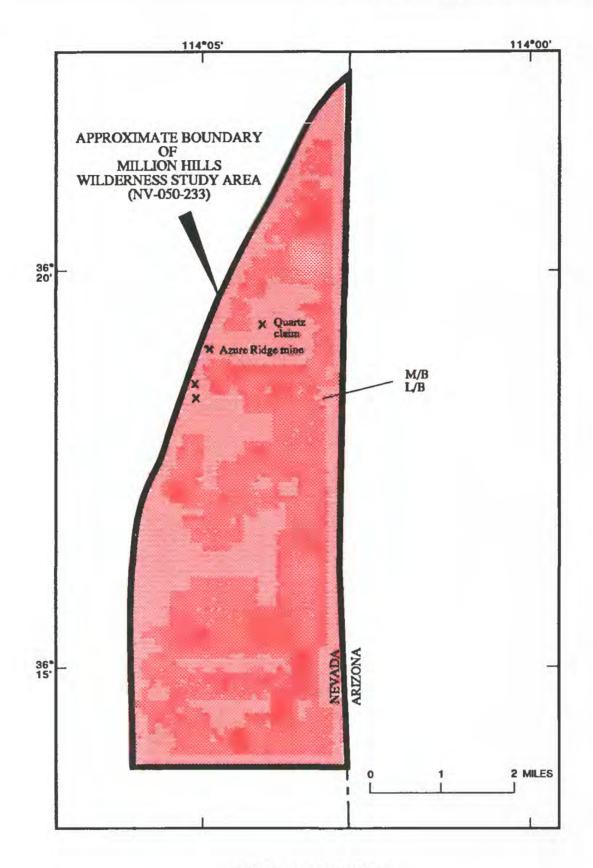
Mineral setting:

The study area is located along the crest of Azure Ridge in the South Virgin Mountains at the eastern margin of the Basin and Range physiographic province. The study area is predominantly composed of Paleozoic sedimentary rocks (mostly limestone and dolomite) that rest unconformably upon Paleozoic granitic and metamorphic rocks. The Paleozoic rocks have been faulted and steeply tilted to form a series of ridges. The northern end of Azure Ridge has been truncated by the Gold Butte Fault, a major northeast trending structural feature in the region.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 11,697 acres that constitute the balance.

References:

- Bergquist, J.R., Nowlan, G.A., Blank, H.R., Podwysocki, M., Turrin, B.D., and Causey, J.D., 1990, Mineral resources of the Million Hills Wilderness Study Area, Clark County, Nevada: U.S. Geological Survey Bulletin.
- Causey, J.D., 1988, Mineral resources of the Million Hills study area, Clark County, Nevada: U.S. Bureau of Mines Open File Report MLA 34-88, 29 p.
- Hewett, D.F., Callaghan, Eugene, Moore, B.N., Nolan, T.B., Rubey, W.W., and Schaller, W.T., 1936, Mineral resources of the region around Boulder Dam: U.S. Geological Survey Bulletin 871, 197 p.
- Longwell, C.R., Pampeyan, E.H., Bowyer, Ben, and Roberts, R.J., 1965, Geology and mineral deposits of Clark County, Nevada: Nevada Bureau of Mines Bulletin 62, 218 p.
- Smith, P.L., and Tingley, J.V., 1983, A mineral inventory of the Esmeralda-Stateline Resource Area, Las Vegas District, Nevada: Nevada Bureau of Mines and Geology Open-file Report 83-11, 173 p.



- M/B Geologic terrane having moderate mineral resource potential for gold, silver, copper, cobalt, lead, zinc, uranium, thorium, and rare earth elements with certainty level B
- L/B Geologic terrane having low mineral resource potential for copper with certainty level B

Mineral resources of the Million Hills Wilderness Study Area.

Area number:

Morey NV-060-191

Size (acres):

20,120 of which 14,560 were studied

at the request of the U.S. Bureau of

Land Management.

Status of

mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of

Mines (John and others, 1987).

Identified mineral resources (known):

Occurrences of low-grade silver, lead, and zinc are present in the northernmost part of the study area, along South Canyon (Nos. 2-4 on fig.) and at the Bringham prospect along the eastern study area boundary

(No. 5 on fig.).

Mineral resource potential (undiscovered): The Morey Wilderness Study Area has areas of moderate and high potential for silver, lead, and zinc and low potential for copper, molybdenum, and tin. In addition, there is low potential for petroleum, natural gas, uranium, and geothermal energy.

Mining activity:

The Morey mining district is adjacent to the northern boundary of the study area. There are no patented claims inside the study area, but unpatented claims on file with the BLM as of July 1989 cover much of the northernmost part, and part of the southern tip of the study area. No production has been reported from in the study area, but the extent of the workings on the Bhum prospect (No. 3 on fig.) indicate that some ore may have been produced. Exploration in the past several years has been limited mainly to just outside and along the northern study area boundary. Companies have been looking for extensions of the Morey silver deposits and possible copper and/or molybdenum deposits, but the occurrences have proved to be uneconomic

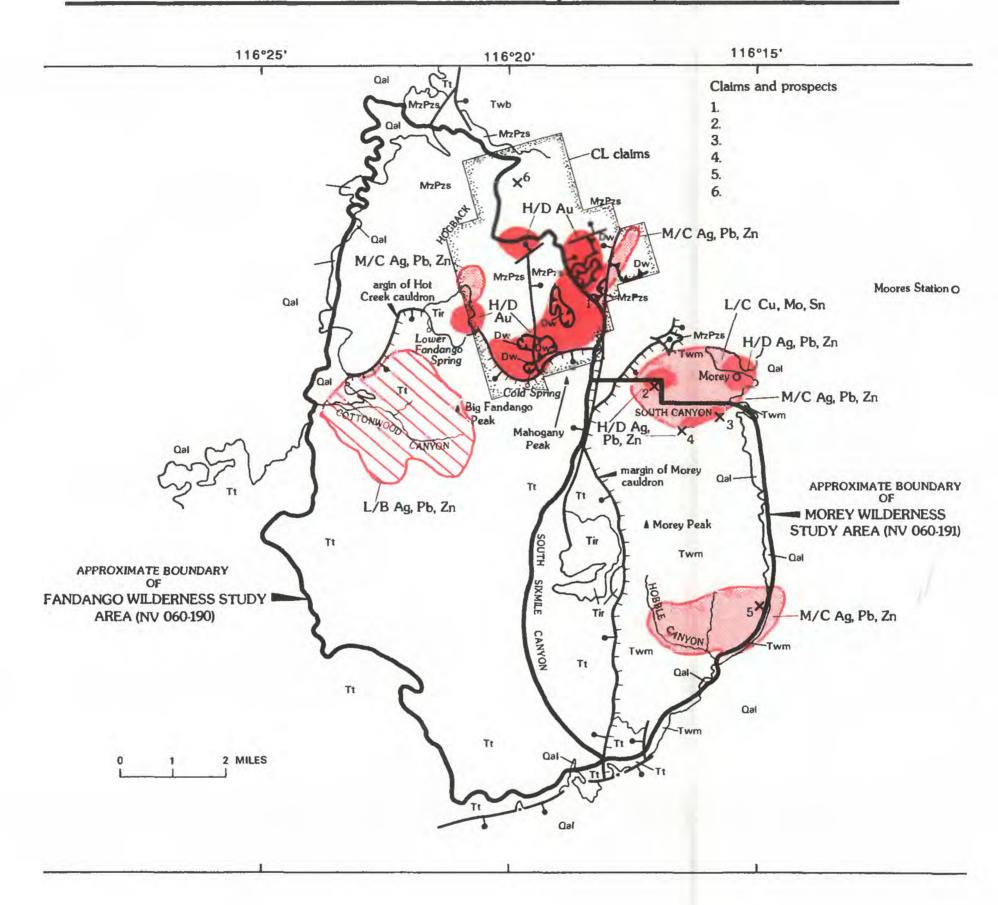
Mineral setting:

The Morey Wilderness Study Area is underlain by middle Tertiary silicic volcanic rocks that are mainly ash-flow tuffs. Several ages and types of faults are present in the study area, including Mesozoic thrust faults and Cenozoic high-angle normal faults.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 5,560 acres that constitute the balance. Continued attention should be given to the study area adjacent to the Morey mining district because improvements in mineral technology and/or metal prices could again make the area a development target. Additional detailed geophysical and geochemical studies are recommended for the South Canyon area because workings and prospects are on mineralized vein systems that may extend from the Morey deposits. The extent of the veins, their interrelationship, and degree of mineralization are unknown.

References:

- John, D.A., Nash, J.T., Plouff, Donald, and McDonnell, J.R., Jr., 1987, Mineral resources of the Morey and Fandango Wilderness Study Areas, Nye County, Nevada: U.S. Geological Survey Bulletin 1731-A, 19 p.
- McDonnell, J.R., Jr., 1985, Mineral investigation of the Fandango (NV-060-190) and Morey (NV-060-191) Wilderness Study Areas, Nye County, Nevada: U.S. Bureau of Mines Open-File Report 61-85, 41 p.



AREA WITH HIGH MINERAL RESOURCE POTENTIAL—Commodities as shown. See appendix 1 and figure 3 for definition of mineral resource potential and certainty of assessment



AREA WITH MODERATE MINERAL RESOURCE POTENTIAL-Commodities as shown



AREA WITH LOW MINERAL RESOURCE POTENTIAL-Commodities as shown

×1 Prospect with identified mineral resource

COMMODITIES

Au Gold

Ag Silve

Cu Copper

Mo Molybdenum

Pb Lead

Sn Tin

Zn Zinc

DESCRIPTION OF MAP UNITS

Qal ALLUVIUM (QUATERNARY)

Tir INTRUSIVE RHYOLITE (TERTIARY)

Tt ASH-FLOW TUFFS (TERTIARY)

TWB WINDOUS BUTTE FORMATION (TERTIARY)

Twm TUFF OF WILLIAMS RIDGE AND MOREY PEAK (TERTIARY)
MzPzs SEDIMENTARY ROCKS (MESOZOIC AND PALEOZOIC)

Dw WOODRUFF (?) FORMATION (DEVONIAN)

MAP SYMBOLS

---- CONTACT

··· HIGH-ANGLE FAULT-Dotted where concealed. Bar and ball on downthrown side

THRUST FAULT-Sawteeth on upper plate

CAULDRON MARGIN-Approximately located

APPROXIMATE BOUNDARY of ACTIVE CLAIMS

×₄ PROSPECT OR CLAIM

Mormon Mountains

Area number:

NV-050-161

Size (acres):

162,887 of which 123,130 were studied at the request of the U.S.

Bureau of Land Management.

Status of mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Shawe and others, 1988; 1990).

Identified mineral resources (known):

No mineral resources were identified in the study area. Large quantities of limestone are present throughout the study area; most of the limestone would be suitable for cement, lime, steel flux, road metal, general chemical, agricultural, paint, and filler. The remote location of the limestone precludes any but local uses because similar and better grade material may be obtained outside the area, nearer to a market place. Sand and gravel is also present throughout the area; however, similar material may be obtained outside the area.

Mineral resource potential (undiscovered):

The study area has high mineral resource potential for (1) copper, lead, zinc, silver, and (or) gold in its southern part and (2) copper, lead, zinc, silver, gold, arsenic, and (or) antimony in its northern part. Part of the study area has moderate mineral resource potential for antimony. Two areas in the central part of the study area have moderate mineral resource potential for tungsten, molybdenum, and (or) tin. The remainder of the study area has low mineral resource potential for all metals. The study area has moderate energy resource potential of oil and gas, except for areas of low potential where significant hydrothermal activity has occurred. It has low mineral and energy resource potential for manganese, barite, vermiculite, coal, and geothermal energy.

Mining activity:

The Viola mining district is about 15 miles north of the study area and has produced an unknown amount of silver and copper. About 11,500 tons of fluorspar were mined in 1958.

The Gourd Spring mining district is about 2 miles east of the study area. In 1929, 60 tons of manganese were mined. Tungsten prospecting began in the 1940's, but production is unknown. In recent years 300-400 placer claims have been staked on alluvial fans in the area. As of August 1989, 39 placer and 58 hard rock mining claims were on file with the BLM, but no evidence of any current mining activity was found in the area.

The Whitmore mine is located near the center of the study area. A low-angle brecciated quartz vein contains silver and copper.

The Iron Blossom prospect, about 6 miles north of the Whitmore mine, is in silicified iron oxides at the contact of Tertiary rhyolites and Paleozoic limestones. Samples contained copper, lead, and zinc. The mineral occurrences are small in size and contain low metal concentrations.

In previous years, the entire study area has been under lease or lease application for oil and gas. As of Sept. 1989, thirty one sections are under lease in the area. There is no recorded production from within the study area.

July 1989 BLM records show no claims active in the WSA.

Mineral setting:

The study area is near the south end of the Nevada-Utah section of the Basin-range tectonic province. The Mormon Mountains form a domelike structure, the core of which is ancient Precambrian crystalline rocks (see geologic time chart) that are exposed in small patches at the west edge of the study area and just south of the study area. Doming of the mountains probably was a result of intrusion of igneous rocks sometime in Mesozoic-Tertiary time. Cambrian clastic marine sedimentary rocks lie in depositional contact upon the crystalline rocks. A series of low-angle faults has episodically moved a thick section of Paleozoic marine sedimentary rocks, mostly carbonate strata, onto the older rocks. Tertiary volcanic rocks, in part also emplaced on low-angle faults, occur along the north margin of the study area. Younger high-angle faults of diverse orientations offset the low-angle faults and the rock formations.

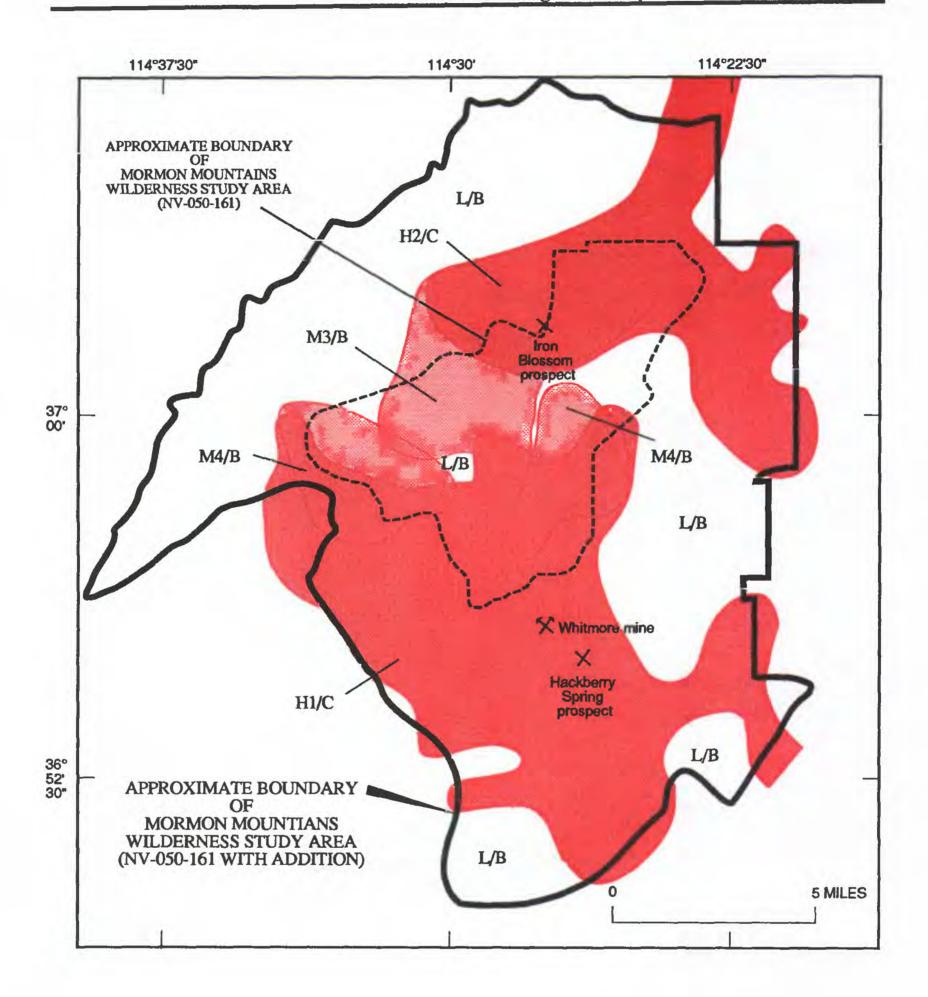
Recommendations:

As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 29,757 acres that constitute the balance.

References:

- Barton, H.N., and Day, G.W., 1984, Reconnaissance geochemistry of the Mormon Mountains, Bureau of Land Management Wilderness Study Area (NV 050-0161), Lincoln County, Nevada: U.S. Geological Survey Open-File Report 84-361, 47 p.
- Great Basin GEM Joint Venture, 1983, Mormon Mountains G-E-M resources area (GRA No. NV-27) technical report (WSA NV 050-0161): Reno, Nevada, Great Basin GEM Joint Venture for U.S. Bureau of Land Management contract YA-553-RFP2-1054 Open-File Report, 33 p.
- Rains, R.L., 1986, Mineral Resources of the Mormon Mountains study area, Lincoln County, Nevada: U.S. Bureau of Mines Open-File Report MLA 69-86, 20 p.
- Scott, D.C., 1989, Mineral investigations of an additional part of the Mormon Mountains Wilderness Study Area (NV-050-161), Clark and Lincoln Counties, Nevada: U.S. Bureau of Mines Open-File Report, 17 p.
- Shawe, D.R., Blank, H.R., Jr., Wernicke, B.P., Axen, G.J., Barton, H.N., Day, G.W., and Rains, R.L., 1988, Mineral resources of the Mormon Mountains Wilderness Study Area, Lincoln County, Nevada: U.S. Geological Survey Bulletin 1729-B, 18 p.

- Shawe, D.R., Blank, H.R., Jr., Wernicke, B.P., Axen, G.J., Barton, H.N., Day, G.W., and Scott, D.C., 1990, Mineral resources of the Mormon Mountains Wilderness Study Area and addition, Lincoln County, Nevada: U.S. Geological Survey Open-File Report.
- Stewart, J.H., 1980, Geology of Nevada: Nevada Bureau of Mines and Geology Special Publication 4, 136 p.
- Tschanz, C.M., and Pampeyan, E.H., 1970, Geology and mineral deposits of Lincoln County, Nevada: Nevada Bureau of Mines Bulletin 73, 188 p.



Mineral resources of the Mormon Mountains Wilderness Study Area.

[Energy resource potential for oil and gas is moderate, with certainty level B, except that zones of igneous intrusion or extensive hydrothermal alteration have low energy resource potential for oil and gas, with certainty level B. Entire study area has low mineral and energy resource potential for (1) manganese, barite, coal, and geothermal energy, with certainty level B, and (2) vermiculite, with certainty level D]

	TT1 10	0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	H1/C	Geologic terrane having high mineral resource potential for commodity 1, with certainty level C
	H2/C	Geologic terrane having high mineral resource potential for commodity 2, with certainty level C
	M3/B	Geologic terrane having moderate mineral resource potential for commodity 3, with certainty level B
1	M4/B	Geologic terrane having moderate mineral resource potential for commodity 4, with certainty level B
	L/B	Geologic terrane having low mineral resource potential for all metals, with certainty level B
		Commodities
	1	Vein (including breccia-vein), replacement (including manto), porphyry, stockwork, and (or) tactite-type deposits of lead, silver, copper, zinc, and (or) gold
	2	Vein (including breccia-vein), replacement (including manto), porphyry, stockwork, and (or) tactite-type deposits of lead, silver, copper, zinc, arsenic, antimony, and (or) gold, and disseminated gold
	3	Vein deposit of antimony
	3 4	Vein, stockwork, porphyry, and (or) tactite-type deposits of tungsten, molybdenum, and (or) tin
		Certainty Levels
	В	Data indicate geologic environment and suggest level of resource potential
	C	Data indicate geologic environment and resource potential but do not establish activity of resource-forming processes
	D	Data clearly define geologic environment and level of resource potential, and indicate activity of resource-forming processes in all or part of study area

Area number:

Mount Grafton NV-040-169

Size (acres):

73,216 of which 30,115 were studied at the request of the U.S. Bureau of

Land Management.

Status of mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Van Loenen and others, 1987).

Identified mineral resources (known):

Identified resources within the area studied are 2,000 short tons of 0.1 percent WO₃ at the Deer Trail Mine, and 1,000,000 short tons of 0.4 percent zinc in tactite above Swartz Canyon.

Mineral resource potential (undiscovered):

A high mineral resource potential exists for tungsten, zinc, and copper in tactite deposits. A moderate mineral resource potential was assigned to areas that may contain small vein and replacement deposits of one or more of the following commodities: tungsten, silver, zinc, lead, gold, and fluorite resources; potential for these commodities in all other areas is low. The study area has a low potential for oil and gas, uranium and thorium, and geothermal and clay resources.

Mining activity:

Mineralized fractures in the area studied and its periphery were evaluated intermittently between the mid-1800's and the late 1970's. At various times, adits, trenches, shafts, and pits were excavated to explore for silver, gold, lead, tungsten, zinc, and copper. The only known mineral production from within the study area was in 1956, when 134 short tons of tungsten ore were produced at the Deer Trail Mine.

Mineral setting:

The wilderness study area is underlain mainly by a thick sequence (approximately 20,000 ft) of clastic and carbonate rocks that was deposited in the Great Basin during the Late Proterozoic and Paleozoic Eras (see geologic time scale on last page of this report). These rocks, mainly quartzite, shale, limestone, and dolostone, range in age from Late Proterozoic through Middle Devonian. During the late Cenozoic this thick sequence of rocks was shaped by uplift and fractured into its present form. Nearly 14,000 ft of displacement is estimated to have occurred along the major border faults responsible for the present high relief.

The southern part of the study area is relatively simple uplifted fault block tilted 35° toward the east. The northern part of the study area is characterized by many small irregularly shaped fault blocks displaying a down-to-the-north stair-stepping caused by east-west faulting. Folding is absent in these strata except where expressed as drag along the high-angle faults.

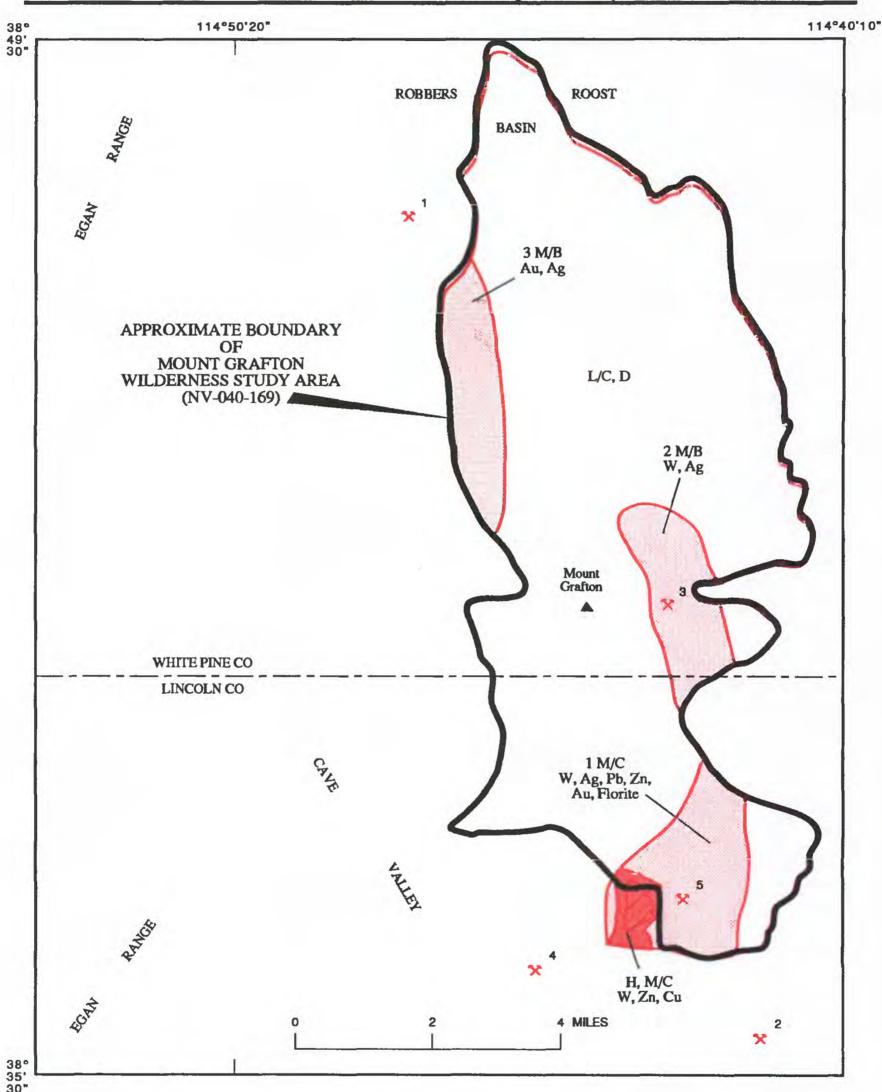
Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 43,101 acres that constitute the balance. Further exploration for metals in the area studied may be fruitful. Most mineralized structures on the study area periphery are in structures which are not traceable into the area. However, these sites indicate the type and size of mineralized localities that may be encountered in similar fractures within the same stratigraphic horizon in the area studied.

> Metals produced from the area periphery include silver, tungsten, lead, and possibly zinc, copper, and gold. It is doubtful that production from any of these deposits exceeded 500 tons. Extensive parts of the area studied that are underlain by quartzite, carbonate rock, or shale may contain similar mineralized fractures that are covered and unevaluated. Some of the known deposits on these lands contain identified resources of zinc (5.6 million short tons of 1.1 percent Zn at Swartz Canyon), tungsten (75,000 short tons of 0.41 percent WO₃ and 25,000 short tons of 0.033 percent WO₃ at the Cinch Mine; 10,000 short tons of 0.33 percent WO₃ and 400 short tons of 0.19 percent WO₃ at the Eagle Rock Mine), and silver (10,000 short tons of 2.4 oz silver/ton and 400 short tons of 1.5 oz silver/ton at the Eagle Rock Mine; 20,000 short tons of 0.6 oz silver/ton and 40,000 short tons of 4.5 oz silver/ton at the Marich claims. Parts of the Lady Linda and the Lake Valley silver lode claim groups are within the area studied, but there are no excavations on those claims within the area.

> Hydrocarbon exploration may be warranted. Oil and gas leasing in the region includes 0.2 sq mi of the area studied. Accumulated data are insufficient at present to prove or disprove the existence of hydrocarbon traps at depth below possible decollement zones. Known data are unavailable and considered proprietary by various petroleum and seismic companies. Regionally, oil traps are situated in Tertiary volcanic rocks below 4,000 ft in depth.

References:

Van Loenen, R.E., Blank, H.R., Jr., Barton, Harlan, and Chatman, M.L., 1987, Mineral resources of the Mount Grafton Wilderness Study Area, Lincoln and Churchill Counties, Nevada: U.S. Geological Survey Bulletin 1728-F, 24 p.



Mineral resources of the Mount Grafton Wilderness Study Area.



Area of identified resources of zinc in low-grade deposits and geologic terrane having high resource potential for tungsten and copper in a tactite deposite, with certainty level C

Mine or prospect having identified resources

- 1. Marich claims (silver)
- 2. Cinch mine (tungsten)
- 3. Deer Trail mine (tungsten)
- 4. Eagle Rock mine (tungsten, silver)
- 5. Workings at the head of Schwartz Canyon (zinc)

H,M/C

Geologic terrane having high resource potential for tungsten, zinc, and copper in a tactite deposite, with certainty level C, and moderate resource potential for tungsten, lead, zinc, silver, gold, and fluorite in hydrothermal veins and replacement deposits, with certainty level C

IM/C

Geologic terrane having moderate resource potential for tungsten, lead, zinc, silver, gold, and fluorite in veins and replacement deposits, with certainty level C

3M/B

Geologic terrane having moderate resource potential for tungsten and silver in vein deposits, with certainty level B

L/C,D

Geologic terrane having low resource potential for (1) tungsten, lead, zinc, silver, and gold in tactite, hydrothermal vein, and replacement deposits (applies to all uncolored areas), and (2) uranium and thorium, oil and gas, and geothermal resources (applies to entire study area), with certainty level C; and for clay (applies to entire study area), with certainty level D

Mount Limbo

Area number:

NV-020-201

Size (acres):

23,702 of which 12,900 were studied at the request of the U.S. Bureau of

Land Management.

Status of

mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of

Mines (Keith and others, 1986).

Identified mineral resources (known):

No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential

(undiscovered):

The results of these surveys indicate the existance of a zone with moderate potential for gold and silver in the southern end of the study area. Elsewhere within the study area, the potential for gold and silver resources is low. Potential for geothermal resources is low in the entire study area. The granitic and volcanic rocks found in the study area are

unfavorable for the accumulation of oil and gas.

Mining activity: There are no active claims in the Wilderness Study Area (BLM records, July 1989). A large group of claims located since the mineral surveys by Rocky Mountain Minerals Inc. was abandoned in 1986. Three prospect pits and two 150- by 2-ft-deep trenches were found in the area.

Mineral setting:

The study area comprises a granodiorite pluton of Cretaceous age (63 to 138 million years before present, or Ma) (see Geolgic Time Chart, last page of report) bounded on the east and west by high-angle normal faults. Small felsic to mafic, aplitic to pegmatitic dikes intrude the pluton. Alluviated valleys flank the study area.

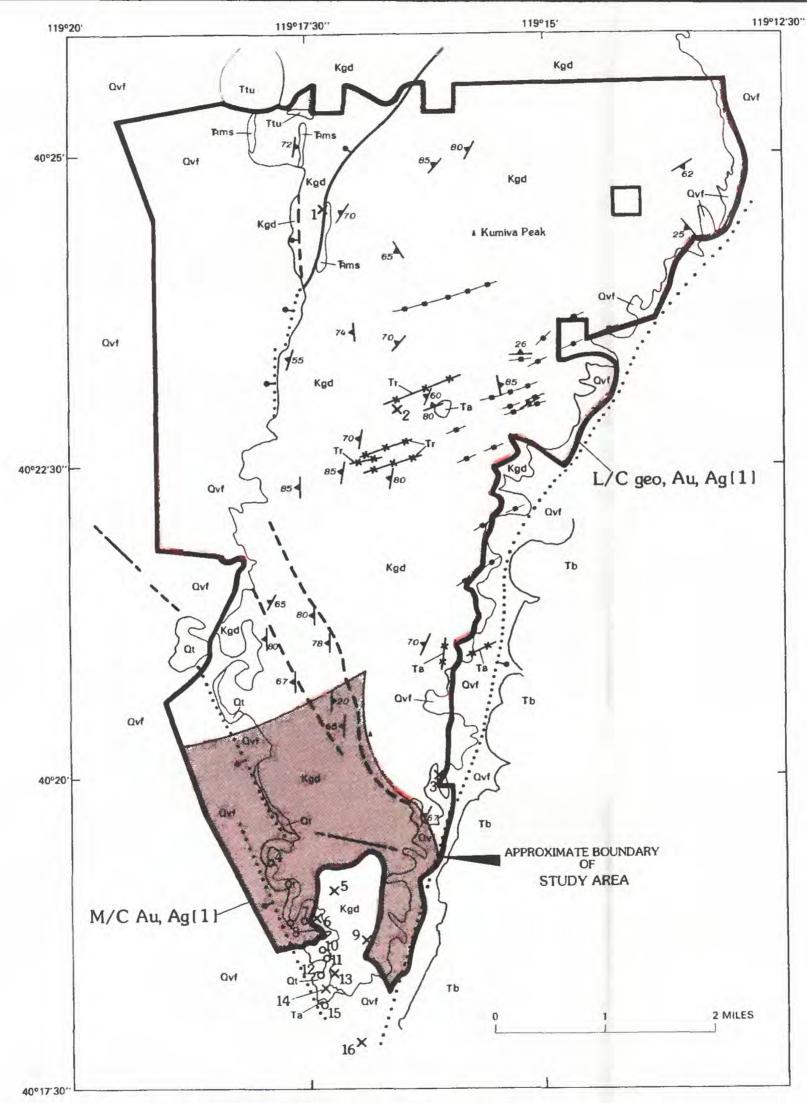
Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 10,802 acres that constitute the balance. Additional investigations may be warranted at calcareous sinter sites to determine if the sinter is related to thermal spring activity and therefore favorable for epithermal gold mineralization.

References:

Crewdson, R.A., 1974, The geology and mineral deposits of part of the Selenite Range, Pershing County, Nevada: Golden, Colorado, Colorado School of Mines, M.S. thesis, 65 p.

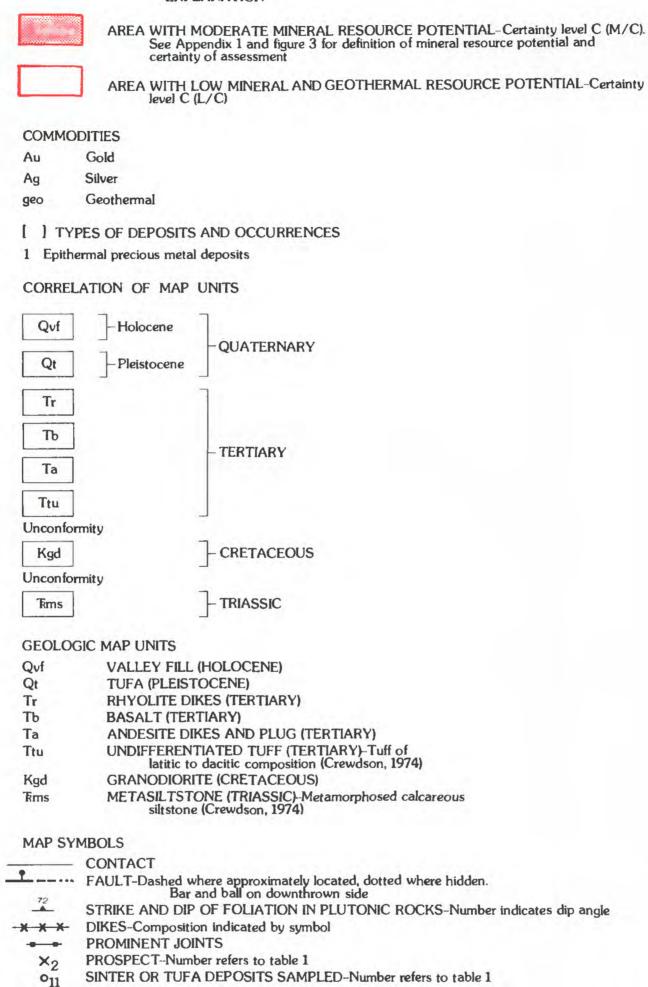
Keith, W.J., R.L. Turner, Plouff, D., Rumsey, C.M. 1986, Mineral resources of the Mount Limbo Wilderness Study Area, Pershing County, Nevada: U.S. Geological Survey Bulletin 1726-A, 11 p.

Rumsey, C.M., 1986, Mineral resources of the Mount Limbo Wilderness Study Area and vicinity, Pershing County, Nevada: U.S. Bureau of Mines Open-File Report 35-86, 11 p.



Mineral resources of the Mount Limbo Wilderness Study Area.

EXPLANATION



Explanation, mineral resources of the Mount Limbo Wilderness Study Area.

Area number:

Size (acres):

Mount Stirling NV-050-401

69,650 of which 40,275 were studied at the request of the U.S. Bureau of

Land Management.

Status of mineral surveys: Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of

Mines (Madrid and others, 1987).

Identified mineral resources (known):

No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential (undiscovered): Rock, stream, and soil samples form the zone of alteration associated with the Grapevine fault system are consistently anomalous in gold that is associated with arsenic mercury, thallium, and antimony. Within the zone of alteration along this fault system the geologic setting and the assemblage of anomalous elements are similar to those at known sediment-hosted disseminated gold deposits elsewhere in Nevada. This zone of alteration has a high mineral resource potential for gold in this type of deposit. Another area of high mineral resource potential for gold occurs at Gold Spring where anomalous amounts of gold are contained within shear zones in quartzite. An area of moderate resource potential for gold is present along part of the Wheeler Pass thrust where gold is associated with silicified limestone of lower plate parallel to, and just below the thrust fault. One area that crosses the range north of Gold Spring has a low mineral resource potential for lead and zinc; another area along the crest of the range south of Mt. Stirling has a low mineral resource potential for manganese and zinc; both are associated with quartz-hematite vein systems in metamorphic rocks. A third area of low mineral resource potential for copper, lead, and zinc is present at Big Timber Spring where alteration is associated with spring. An area south of Big Timer spring has an unknown mineral resource potential for gold along a poorly exposed normal fault system.

Mining activity: Mines in the Johnnie District, about three miles west of the study area. have produced an estimated \$1,966,000 in gold from quartz veins (Ivosevic, 1976). The Stirling mine, about one mile from the northwestern boundary, has been worked for gold in the past.

Previous to the joint wilderness study, less than 35 claims had been located inside the WSA. July 1989 BLM records show about 95 claims active in the WSA. About 90 of these are in the northwest portion of the study area. During the 1984 investigation (Conyac, 1985), three shafts less than 20 feet deep, a 28-foot adit, and seven pits were in the study area.

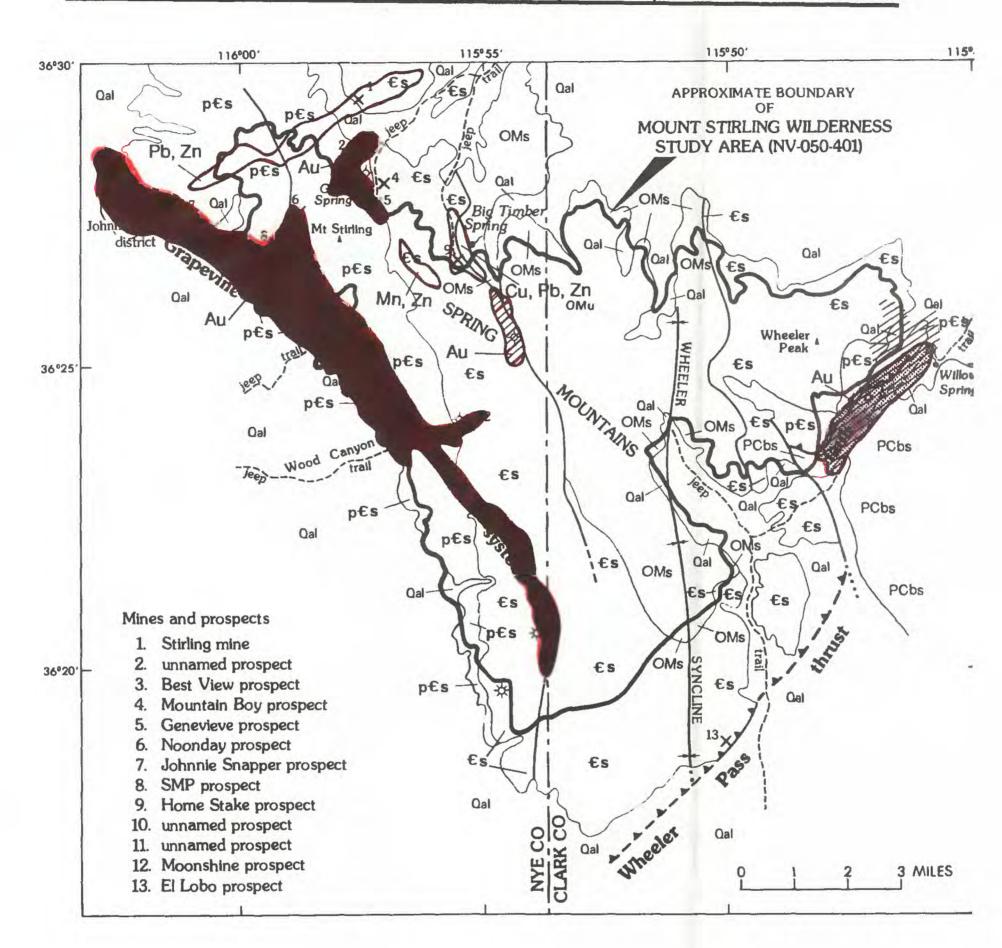
Mineral setting:

The northern Spring Mountains, have rugged terrain and high relief and are composed of Late Proterozoic to Permian (about 700 to 280 Ma) siliciclastic and carbonate sedimentary strata that were deposited on the Proterozoic and paleozoic continental margin. These rocks were compressively folded and thrust faulted during the Mesozoic (about 240 to 66 Ma) and were subjected to high-angle normal faulting prior to and as part of extensional tectonism during the Tertiary (66 to 1.7 Ma). Quaternary alluvial deposits occur within the wilderness study area. Stratabound occurrences of copper-silver minerals are in quartzite, and gold exists locally in quartz veins in carbonate rocks.

Recommendations:

As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 29,375 acres that constitute the balance. Further detailed mapping and sampling of rock, soil, and stream sediments is warranted to evaluate stratabound copper and silver occurrences in the vicinity of the Noonday, SMP, and Moonshine prospects. Test drilling would be required to confirm any anomalies. This exploration should be designed to include evaluation of gold-bearing quartz veins and disseminated gold occurrences near prospects along the western edge of the study area in the upper Precambrian and lower Cambrian formations. Targets of highest interest are the intersections of faults with these formations.

- Conyac, M.D., 1985, Mineral resources of the Mt. Stirling Wilderness Study Area, Nye and Clark Counties, Nevada: U.S. Bureau of Mines Open File Report 25-85, 18 p.
- Ivosevic, S.W., 1976, Geology and ore deposits of the Johnnie district, Nye County, Nevada: Reno, Nevada, University of Nevada, M.S. Thesis, 192 p.
- Madrid, R.J., Turner, R., Brickey, D.W., Blank, H.R., and Conyac, M.D., 1987, Mineral resources of the Mt. Stirling Wilderness Study Area, Clark and Nye Counties, Nevada: U.S. Geological Survey Bulletin 1730-B, 20 p.



EXPLANATION

	Area of high mineral resource potential
	Area of moderate mineral resource potential
	Area of low mineral resource potential
	Area of unknown mineral resource potential
	Areas of mineral resource potential defined by maximum extent of alteration mapped in the field
	See appendix for definition of resource potential
	Commodities
Au	Gold
Cu	Copper
Pb	Lead
Zn	Zinc
Mn	Manganese
	Geologic map units
Qal	Alluvium (Quaternary)
PCbs	Bird Spring Formation (Permian and Carboniferous)
OMs	Sedimentary rocks (Mississippian to Ordovician)
€s	Sedimentary rocks (Cambrian)
p-€s	Sedimentary rocks (Precambrian)
	Contact
	Normal fault—Dashed where approximate; dotted where concealed
	Thrust fault—Dashed where approximate
-	Rock sample site containing gold
*	Soil and stream-sediment sample site containing gold
1×	Mine or prospect
<i>'/////</i>	Hydrothermal alteration— Mapped by Landsat Thematic Mapper

Explanation, mineral resources of the Mount Stirling Wilderness Study Area.

Muddy Mountains

Area number:

NV-050-229

Size (acres):

96,170

Status of

mineral surveys:

This wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines

(Bohannon and others, 1982).

Identified mineral resources (known):

The Vanderbilt mine contains montmorillonite clay resources. The Anniversary mine contains about 380,000 tons marginal reserves and 2 million tons inferred resources (borate). Zeolite resources total 4.7 million tons of inferred resources averaging 84% clinoptilolite with a cation exchange capacity of 1.6 meg/g (Leszcykowski and others, 1982).

Lithium occurs in hectorite (clay) in the WSA, but no economic extraction methods occur at present.

Mineral resource potential (undiscovered):

The Muddy Mountains Wilderness Study Area has high potential for deposits of calcium borates and lithium. The area has little potential for mineral deposits of metals (other than lithium). Building stone and silica sand have moderate to low potential in some places. Oil and gas potential within the study area is low.

Mining activity:

The Anniversary mine, on the southern edge of the WSA, produced about 200,000 tons of borate in the 1920's. There was also limited borate production at the American Borax mine on the northeastern edge of the area between 1922 and 1924. The Vanderbilt clay deposit is located in the western portion of the WSA on two patented claims. This operation reported production of 100-200 tons/year montmorillonite clay from 1955 to 1975. The Wyatt Silica mine, just outside the northeastern WSA boundary, produced a limited amount of silica prior to 1936. The Colorock quarry, in the north part of the area, produced minor quantities of flagstone.

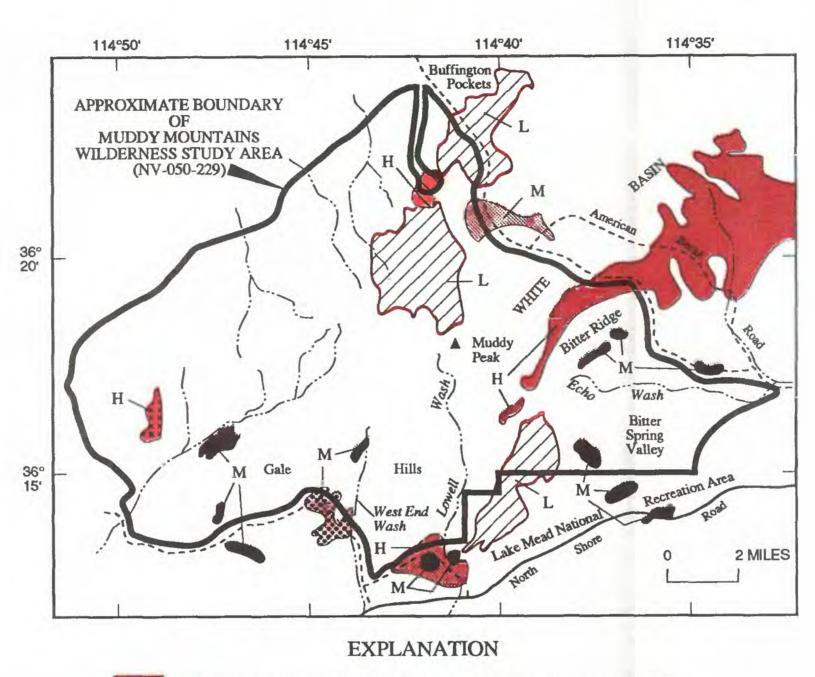
July 1989 BLM records show 158 lode and 18 placer claims active in the WSA. Sixty-four oil and gas leases cover about 95% of the area, with applications pending on the remaining 5%. These leases are held mainly by Amoco, Chevon, and Cities Service. A 10,300 ft exploratory oil well was drilled by Amoco Production in the Colorock area.

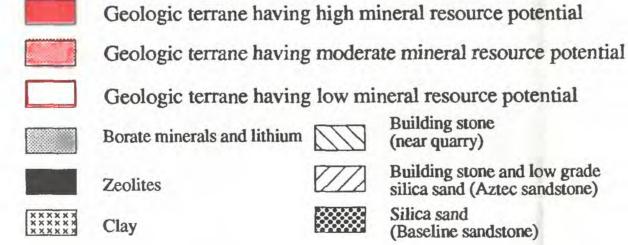
Mineral setting:

Sedimentary rocks of various types and ages are exposed in the Muddy Mountains Wilderness Study Area. Paleozoic rocks are mostly limestone and dolomite with lesser amounts of sandstone that were deposited in a shallow sea. Mesozoic rocks are chiefly nonmarine clastic rocks that formed in tidal flat, floodplain, fluvial, swamp, and eolian environments. Mesozoic nearshore marine rocks are also present. Tertiary rocks were deposited in a complex system of basins tha evolved during Miocene time as the Basin and Range structural province was forming. These consist of various types of lacustrine, fluvial, and alluvial clastic rocks. The Muddy Mountain thrust fault, a Late Cretaceous to early Tertiary(?) structure of regional extent dominates the central and northern parts of the study area. The thrust is probably present in the subsurface throughout the north and western parts of the study area. Several middle Tertiary to Quaternary normal faults are also present in the study area.

Recommendations: No further studies are recommended.

- Hewett, D.F., Callaghan, Eugene, Moore, B.N., Nolan, T.B., Rubey, W.W., and Schaller, W.T., 1936, Mineral resources of the region around Boulder Dam: U.S. Geological Survey Bulletin 871, 197 p.
- Leszcykowski, A.M., Esparza, L.E., and Rumsey, C.M., 1982, Mineral investigation of the Muddy Mountains Wilderness Study Area (BLM), Clark County, Nevada: U.S. Bureau of Mines Open File Report MLA 112-82, 16 p.
- Longwell, C.R., Pampeyan, E.H., Bowyer, Ben, and Roberts, R.J., 1965, Geology and mineral deposits of Clark County, Nevada: Nevada Bureau of Mines Bulletin 62, 218 p.
- Nevada Mining Association, 1988, Nevada BLM Wilderness Study Areas; Mineral Potential Handbook: Nevada Mining Association, Reno, NV, unnumbered pages.
- Vanderburg, W.O., 1937, Reconnaissance of mining districts in Clark County, Nevada: U.S. Bureau of Mines Information Circular 6964, 81 p.





Mineral resources of the Muddy Mountains Wilderness Study Area.

Nellis

Area number:

NV-050-4R-15

Size (acres):

5,718

Status of

mineral surveys:

This area was not studied by the U.S. Bureau of Mines or the U.S.

Geological Survey.

Identified mineral resources (known):

No mineral resources have been identified in the Wilderness Study Area. Sand and gravel occur throughout the area; data are not sufficient to

evaluate the economic significance of these deposits.

Mineral resource potential (undiscovered):

The Nellis Wilderness Study Area has moderate potential for undiscovered deposits of gold, silver, lead, and zinc in buried bedrock as well as for undiscovered deposits of gold in placers. The area also has moderate potential for undiscovered deposits of oil and gas. Occurrences of sand and gravel in the study area are too inaccessible and remote to

have any significant resource potential.

Mining activity:

There is no known mineral production from the Wilderness Study Area. North of the area, the Gass Peak mining district produced zinc, lead,

silver, and gold.

July 1989 BLM mining claim records show four unpatented placer claims located in the alluvium of the area (NV-050-04R-15B). All of the area is covered by oil and gas leases. No geothermal leases are in the area

(Great Basin GEM Joint Venture, 1983).

Mineral setting:

The area is underlain entirely by alluvium, there are no bedrock

outcroppings.

Recommendations:

This Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey. The area should be evaluated for potential sand and gravel use in the nearby Las Vegas, Nev. construction market. Recent placer claims

staked in the area should be evaluated.

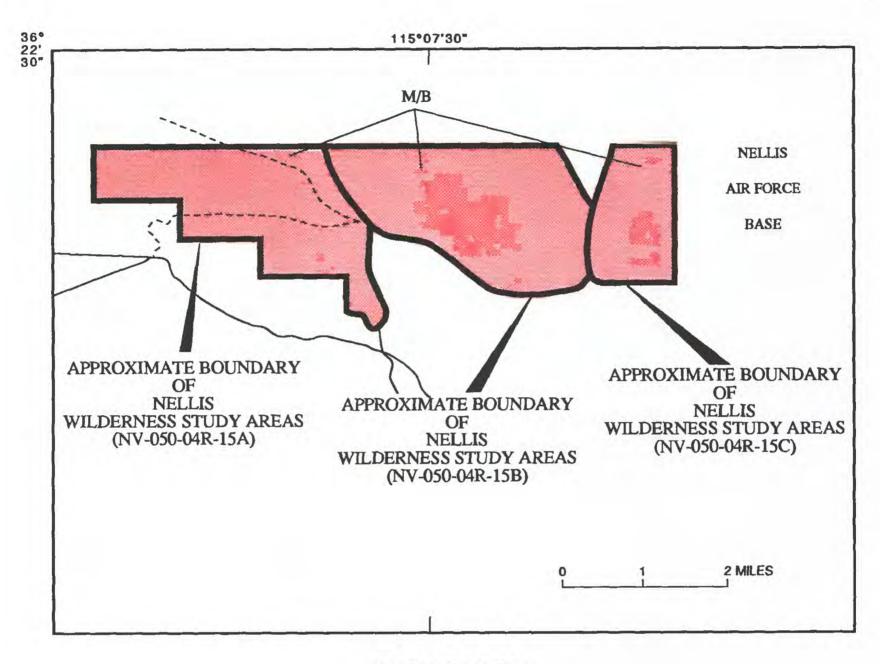
References:

Cornwall, H.R., and Norberg, J.R., 1978, Mineral resources of the Nellis Air Force Base and the Nellis Bombing and Gunnery Range, Clark, Lincoln, and Nye Counties, Nevada: U.S. Geological Survey and U.S. Bureau of Mines report, unpublished.

Great Basin GEM Joint Venture, 1983, Nellis/Quail Spring G-E-M Resources Area (GRA No. NV-33) technical report: Prepared for the U.S. Bureau of Land Management, Denver, Colorado, 26 p.

Longwell, C.R., Pampeyan, E.H., Bowyer, Ben, and Roberts, R.J., 1965, Geology and mineral deposits of Clark County, Nevada: Nevada Bureau of Mines Bulletin 62, 218 p.

- U.S.Bureau of Land Management and U.S. Department of the Air Force, 1981, Final Environmental Impact Statement for the proposed public land withdrawal of the Nellis Air Force Bombing Range, Nye, Clark, and Lincoln Counties, Nevada: 113 p.
- Vanderburg, W.O., 1937, Reconnaissance of mining districts in Clark County, Nevada: U.S. Bureau of Mines Information Circular 6964, 81 p.



EXPLANATION

M/B Geologic terrane having moderate mineral resource potential for gold, silver, lead, zinc, oil and gas with certainty level B

Mineral resources of the Nellis Wilderness Study Area.

Area number:

mineral surveys:

Size (acres):

North Black Rock NV-020-622

30,191

Status of

This area was not studied by the U.S. Bureau of Mines or the U.S.

Geological Survey.

Identified mineral resources (known):

No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential (undiscovered):

The study area has low potential for undiscovered volcanic-hosted mineral resources of gold, mercury, and silver and moderate potential for undiscovered geothermal energy resources.

Mining activity:

The Blue Jack Group, located about three miles east of the study area, produced a small tonnage of copper ore in 1954 which was shipped to a Utah smelter. There are about 45 mining claims in the northeastern portion of the WSA (BLM records, July 1989). The Soldier Meadows KGRA is one mile southwest of the WSA.

Mineral setting:

The study area is part of a north-trending fault-block horst typical of the Basin and Range province. The entire study area is underlain by Tertiary silicic to mafic flows and tuffs and minor beds of tuffaceous sedimentary rocks.

Recommendations:

This Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey.

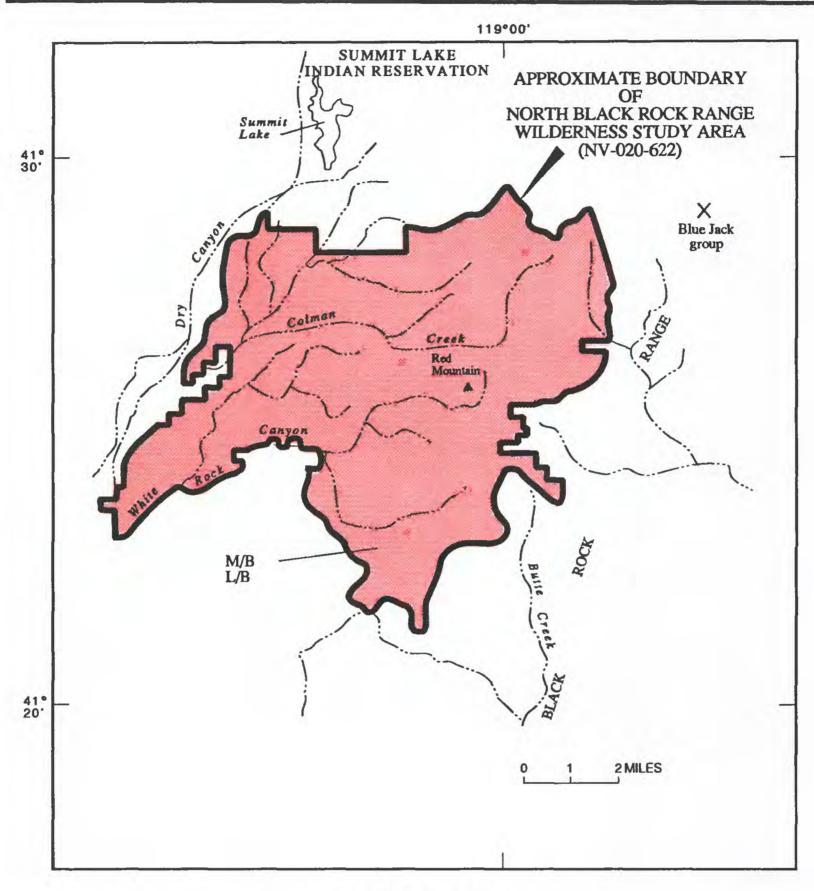
References:

Higgins, L.R., Earnest, D.F., and Cox, A.D., 1988, Nevada BLM Wilderness Study Areas mineral potential handbook: Nevada Mining Association, Reno, Nevada, 257 p.

Noble, D.C., Plouff, Donald, Bergquist, J.R., Barton, H.N., and Olson, J.E., 1987, Mineral resources of the Pahute Peak Wilderness Study Area, Humboldt County, Nevada: U.S. Geological Survey Bulletin 1726-C, 12 p.

Vanderburg, W.O., 1938, Reconnaissance of mining districts in Humboldt County, Nev.: U.S. Bureau of Mines Information Circular 6995, 54 p.

Willden, Ronald, 1964, Geology and mineral deposits of Humboldt County, Nevada: Nevada Bureau of Mines Bulletin 59, 154 p.



EXPLANATION

- M/B Geologic terrane having moderate mineral resource potential for geothermal energy with certatinty level B
- L/B Geologic terrane having low mineral resource potential for gold, silver and mercury with certainty level B

Mineral resources of the North Black Rock Wilderness Study Area.

North Fork of the Little Humboldt River

Area number:

NV-020-827

Size (acres):

69,683 of which 8,900 were studied at the request of the U.S. Bureau of Land

Management.

Status of

mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of

Mines (Peterson and others, 1986).

Identified mineral resources (known):

No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential

(undiscovered):

The rhyolite of the Swisher Mountain Tuff, which comprises the bedrock in the study area, has low potential for mercury resources. The base of the tuff is probably near the surface. Rocks beneath the tuff are similar to those in nearby regions that locally contain disseminated gold, epithermal precious-metal veins, and anomalous amounts of uranium. information is available as to whether there are any undiscovered subsurface deposits in the study area. There is no potential for oil and gas and potential for geothermal resources is unknown.

Mining activity: There is no evidence of any mineral-related activity, historical or recent. There are no mining claims in the area (BLM records, July 1989). There are 498 acres of oil and gas leases in the WSA.

Mineral setting:

Tertiary rhyolite, correlated with the Swisher Mountain Tuff, underlies the entire area but probably does not extend far into the subsurface. Basalt, which is tentatively correlated with the Big Island Formation, forms a thin veneer over the rhyolite in the north (Peterson and Wong, 1985a).

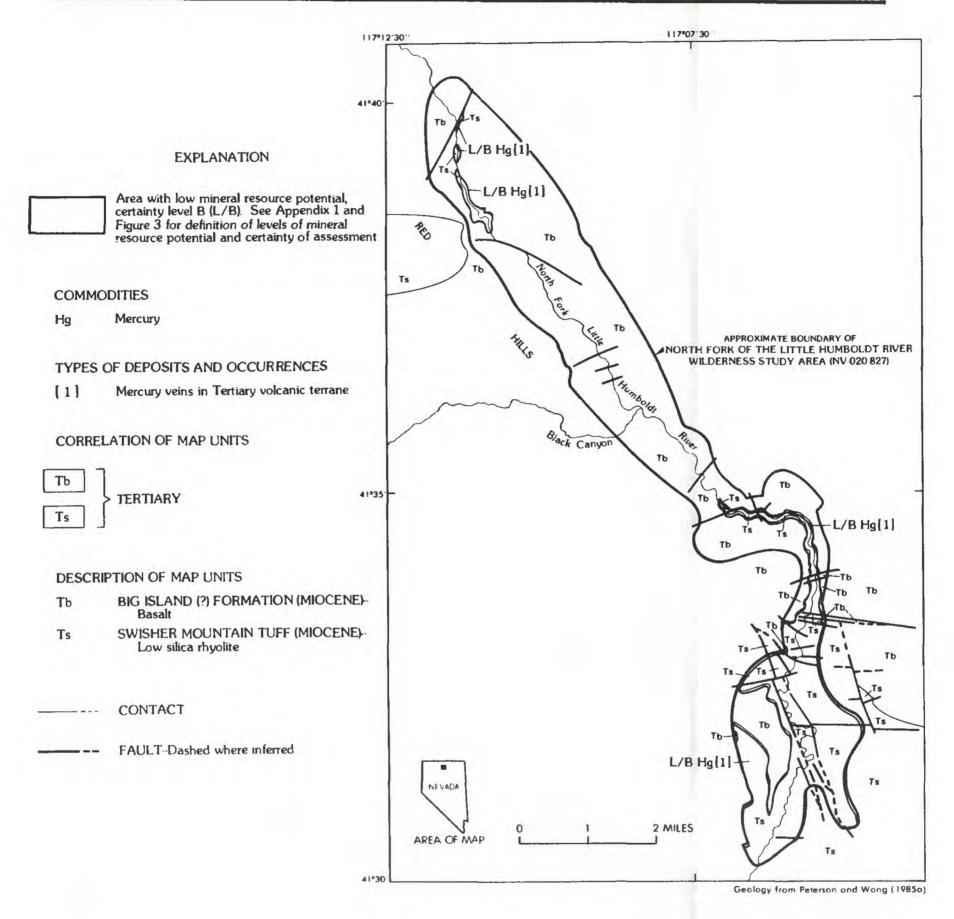
Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 60,783 acres that constitute the balance.

References:

Higgins, L.R., Earnest, D.F., and Cox, A.D., 1988, Nevada BLM Wilderness Study Areas mineral potential handbook: Nevada Mining Association, Reno, Nevada, 257 p.

Leszcykowski, A.M., 1985, Mineral resources of the North Fork Little Humboldt Study Area, Humboldt County, Nevada: U.S. Bureau of Mines open-file report MLA 47-85, 8 p.

- Peterson, J.A., Heran, W.D., and Leszcykowski, A.M., 1986, Mineral resources of the North Fork of the Little Humboldt River Wilderness Study Area, Humboldt County, Nevada: U.S. Geological Survey Bulletin 1732-A, 10 p.
- Willden, Ronald, 1964, Geology and mineral deposits of Humboldt County, Nevada: Nevada Bureau of Mines Bulletin 59, 154 p.



Mineral resources of the North Fork of Little Humboldt River Wilderness Study Area.

North Jackson Mountains

Area number: Size (acres):

NV-020-606 26,457

Status of

mineral surveys:

This area was not studied by the U.S. Bureau of Mines or the U.S.

Geological Survey.

Identified mineral resources (known):

The only identified mineral resources in or immediately adjacent to this WSA are iron and sand and gravel. The sand and gravel resources are

suitable for use locally.

There are iron resources at the Iron King (Delong) Mine, RedBird Mine, and Black Jack Mine located near the southeastern corner of the area. These mines are all past producers, according to mineral records, and

account for an estimated 3 million dollars in production.

Known metal occurrences in the area include iron, silver, copper, lead,

mercury, gold, and barite.

Mineral resource potential (undiscovered): The study area has moderate potential for undiscovered mineral resources of iron in dioritic intrusions and moderate mineral resource potential for copper, gold lead, silver, and zinc in epithermal deposits related to possible volcanogenic exhalative vent zones. Occurrences of sand and gravel in the study area are too inaccessible and remote to have any

significant resource potential.

Mining activity: Three miles east of the area there are four mines (Baldwin, Blue Can,

Birthday, and Red Ore) with recorded mercury production.

July 1989 BLM records show 24 placer and 151 lode claims in or immediately adjacent to the WSA. Most of these claims are in the eastern and southern parts of the area. Pegasus Gold Mines had an active interest in the area as recently as 1986. Most of the currently active claims are held by small operators and are in the southern and eastern parts of the area in the Jackson Creek mining district, New Years Canyon Zone, and

Happy Creek Zone.

Mineral setting:

The study area is underlain by Cretaceous to Triassic volcanic flows and volcaniclastic metasediments that are intruded by Cretaceous and Jurassic

felsic to mafic stocks and plugs.

Recommendations: Continued interest in the area by large and small operators indicates some

potential. This Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the

U.S. Geological Survey.

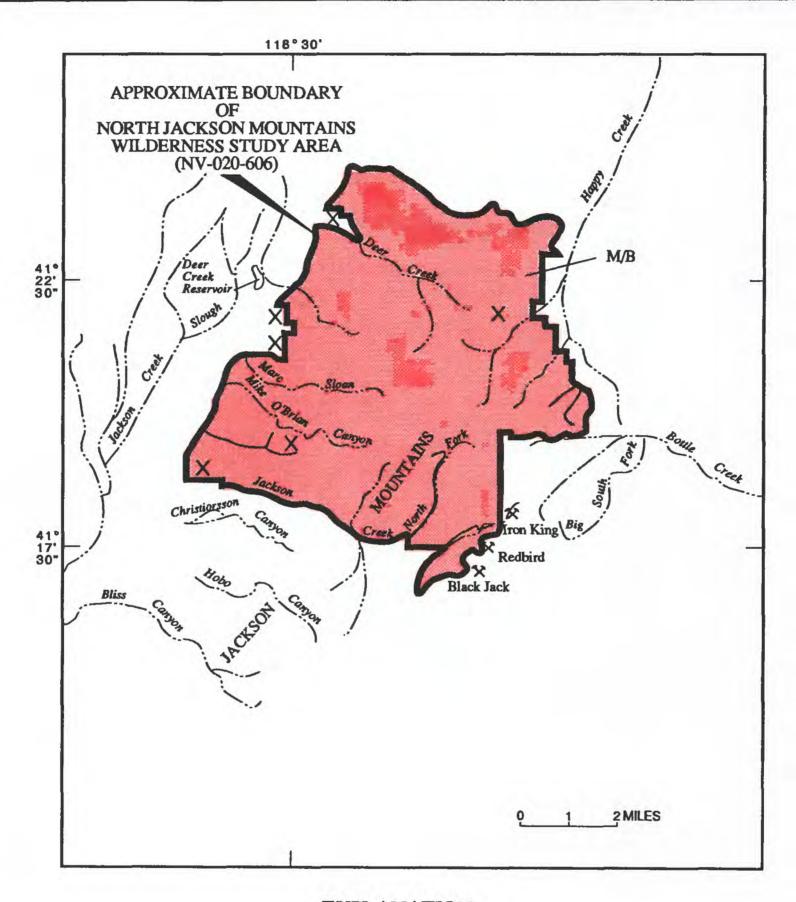
References:

Shawe, F.R., Reeves, R.G., and Kral, V.E., Iron Ore Deposits of

Northern Nevada: Nevada Bureau of Mines and Geology, Bulletin

53 part C, p. 79-128.

- Sorensen, M.L., Plouff, Donald, Turner, L.T., and Hamilton, M.M., 1987, Mineral resources of the South Jackson Mountains Wilderness Study Area, Humboldt County, Nevada: U.S. Geological Survey Bulletin 1726-B, 14 p.
- Vanderburg, W.O., 1938, Reconnaissance of Mining Districts in Humboldt County, Nevada: U.S. Bureau of Mines Information Circular 6995, 54 p.
- Willden, R., 1964, Geology and Mineral Deposits of Humboldt County, Nevada: Nevada Bureau of Mines and Geology, Bulletin 59, 154 p.



EXPLANATION

M/B Geologic terrane having moderate mineral resource potential for gold, silver, copper, lead, zinc, and iron with certainty level B

Mineral resources of the North Jackson Mountains Wilderness Study Area.

North McCullough Mountains

Area number:

NV-050-425

Size (acres):

47,166

Status of

mineral surveys:

This area was not studied by the U.S. Bureau of Mines or the U.S.

Geological Survey.

Identified mineral resources (known):

No mineral resources have been identified in the Wilderness Study Area; however, in 1984 Tri-Delta Mining Co. mined lightweight aggregate (pumice) from their Las Vegas Rilite pit in the southwest corner of the area (T. 25 S., R. 61 E., sec. 9) (Jones and Papke, 1984). Lightweight aggregate resources probably remain near this open pit. Perlite and manganese prospects are on the northern boundary of the area; data is insufficient to determine whether resources are present at these locations.

Mineral resource potential (undiscovered): The North McCullough Mountains study area has low potential for a variety of metals that may occur in quartz veins in the volcanic rocks, including gold, silver, lead, zinc, copper, manganese, and tungsten. There is abundant sand and gravel on the east and west sides of the study area, but similar deposits are widely available outside the study area and closer to major markets; there is low potential for significant resources of these commodities in the study area. There is low potential for pumice and perlite, and for oil and gas, chiefly in the valley-filling sediments that flank the range (Sandberg, 1983).

Mining activity:

Lightweight aggregate was mined from an open pit in the southwestern corner of the area by Tri-Delta Mining, Inc. (Jones and Papke, 1984). U.S. Bureau of Mines MILS records indicate Continental Engineering Co. held perlite claims on the northern boundary of the area, and a manganese prospect was located on the eastern flank of Black Mountain near the area boundary. An unidentified prospect (shaft symbol) is shown on the Sloan, NV 15' topographic map (T. 24 S., R. 62 E., sec.

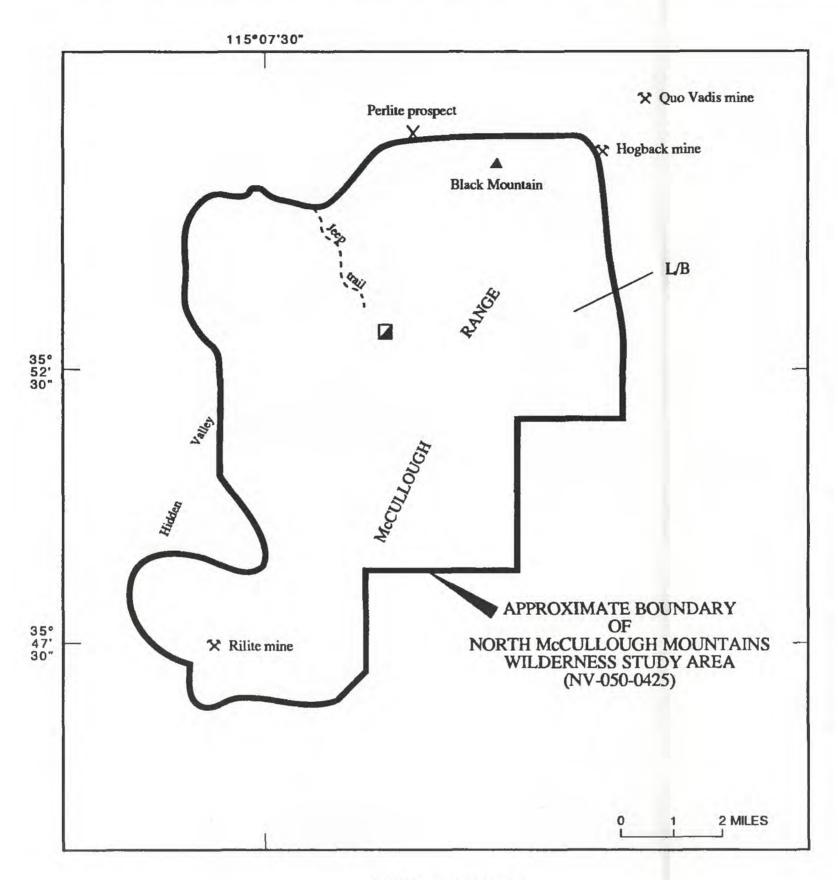
July 1989 BLM mining claim records show 90 placer and 40 lode claims in the WSA.

Mineral setting:

The study area is underlain primarily by basaltic to andesitic lava flows of Miocene age. These rocks are flanked by valley-filling Quaternary and Tertiary sediments in the basins adjacent to the range.

Recommendations: This Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines. Detailed geologic mapping and sampling of pumice and perlite deposits is needed to identify possible industrial mineral resources. A mineral study is particularly important because of the lack of specific information about prospects and mineralized structures known to be in the North McCullough Wilderness Study Area.

- Elevatorski, E.A. (manager), 1973, Nevada industrial minerals: MINOBRAS, Dana Point, California, 62 p.
- Great Basin GEM Joint Venture, 1983, McCullough Mountains G-E-M Resources Area (GRA No. NV-36) technical report: Prepared for the U.S. Bureau of Land Management, Denver, Colorado, 34 p.
- Jones, R.B. and Papke, K.G., 1984, Active mines and oil fields in Nevada--1983: Nevada Bureau of Mines and Geology, Map 84, scale 1:1,000,000.
- Longwell, C.R., Pampeyan, E.H., Bowyer, Ben, and Roberts, R.J., 1965, Geology and mineral deposits of Clark County, Nevada: Nevada Bureau of Mines and Geology Bulletin 62, 218 p.
- Sandberg, C.A., 1983, Petroleum potential of wilderness lands in Nevada: U.S. Geological Survey Circular 902-H, p. H1-H11.
- Vanderburg, W.O., 1937, Reconnaissance of mining districts in Clark County, Nevada: U.S. Bureau of Mines Information Circular 6964, 81 p.



EXPLANATION

L/B Geologic terrane having low mineral resource potential for gold, silver, lead, zinc, manganese, tungsten, sand and gravel, pumice, perlite, and oil and gas with certainty level B

Mineral resources of the North McCullough Mountains Wilderness Study Area.

Owyhee Canyon NV-010-106

Area number: Size (acres):

21,875 of which 13,525 were studied at the request of the U.S. Bureau of

Land Management.

Status of

mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Foord

and others, 1987).

Identified mineral resources (known):

No mineral resources have been identified within the studied part of the Wilderness Study Area. Sand and gravel occurrences in bars along the Owyhee River and tributaries may have minor local construction uses. Volcanic rocks may be used as dimension stone, but they have no unique properties that would make them preferable to other, more accessible deposits closer to potential markets.

Mineral resource potential (undiscovered):

The Owyhee Canyon Wilderness Study Area has low potential for metals and nonmetals, oil, gas, coal, and geothermal energy.

Mining activity:

July 1989 BLM records show mining claims active in the WSA, and no mineral commodities have been produced. Oil and gas leases and lease applications cover a portion of the north end of the area. Some geophysical exploration for oil and gas may have been completed in conjunction with these leases; however, no drilling was done (Capstick and Buehler, 1986).

Mineral setting:

The Owyhee Canyon Wilderness Study Area is located on the Owyhee Upland, and extensive volcanic plateau capped by basaltic lava flows that were erupted intermittently between about 10 and 6 million years ago. These basalts lie on 14 million year old rhyolitic tuff that outcrops in several small areas in the bottom of Owyhee Canyon.

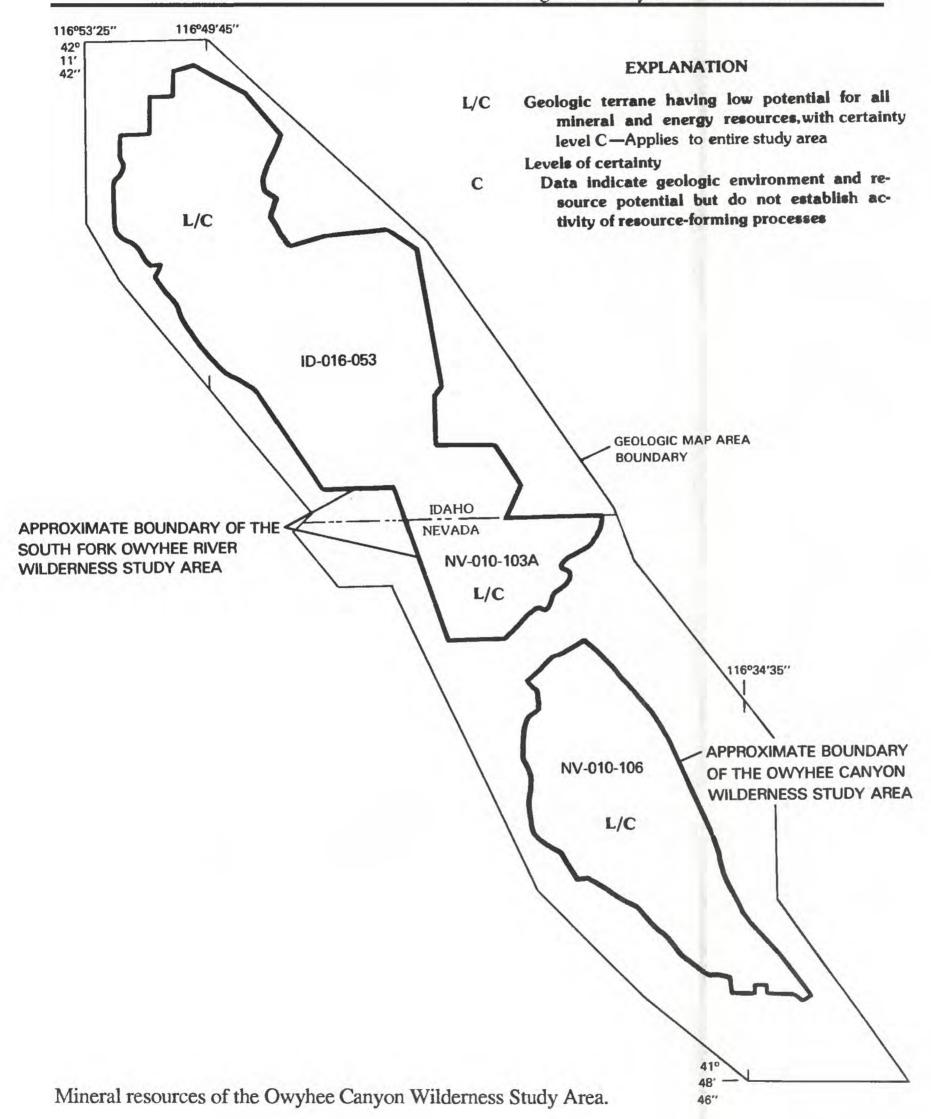
Recommendations:

As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 8,350 acres that constitute the balance.

References:

Capstick, D.O., and Buehler, A.R., 1986, Mineral resources of the Owyhee Canyon study area, Elko County, Nevada: U.S. Bureau of Mines Open File Report MLA 12-86, 9 p.

Foord, E.E. Luessen, M.J., Hovorka, D.S., Plesha, J.L., Grauch, V.J.S., Barton, Harlen, King, H.D., Capstick, D.O., Mayerle, R.T., Buehler, A.R., and Gabby, P.N., 1987, Mineral resources of the Owyhee Canyon and South Fork Owyhee River Wilderness Study Areas, Elko County, Nevada, and Owyhee County, Idaho: U.S. Geological Survey Bulletin 1719-F, 20 p.



Area number:

Pahute Peak NV-020-621

Size (acres):

57,529 of which 25,200 were studied at the request of the U.S. Bureau of

Land Management.

Status of mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Noble and others, 1987).

Identified mineral resources (known):

No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential (undiscovered):

Three areas are identified as having mineral resource potential, and one area has potential for geothermal resources. An area at the northwest corner of the study area has moderate resource potential for gold, silver, copper, lead, zinc, molybdenum, and tungsten. An area adjacent and partially overlapping to the south has high resource potential for gold and silver. Most of the northern two-thirds of the study area has moderate resource potential for gold and silver. An area in the southwestern part of the study area has high potential for geothermal resources. There is low potential throughout the study area for mercury and uranium resources. Minor amounts of opal and petrified wood are found in the study area, but there is no indication of resource potential.

Mining activity:

There is one 300-ft adit in Copper Canyon, as well as other less extensive workings, exploring small quartz veins and poorly developed skarn zones. Nothing is known about possible production. Studies of the Copper Canyon area by the U.S. Bureau of Mines (Olson, 1986) found 15.2 and 16.6 ppm silver in two samples, and up to 8 percent zinc in seven samples. The deposit is too poorly known to have identified resources (Olson, 1986). Anomalous values of gold, silver, and arsenic were also found near a fault-controlled zone south of Copper Canyon (Olson, 1986).

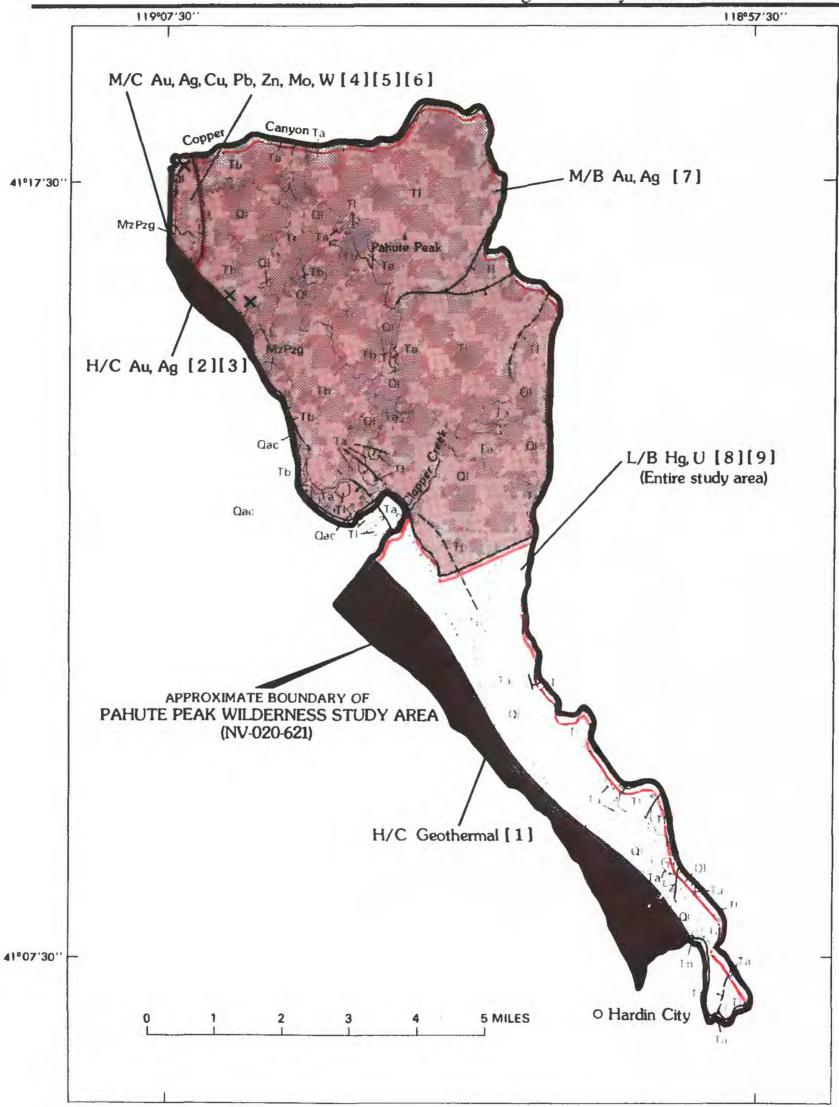
There are about 70 mining claims in the WSA, mostly in the western portion (BLM records, July 1989). There are 10,334 acres of oil and gas leases. Double Hot Springs KGRA includes a small portion of the southern part of the WSA. The Soldier Meadow KGRA is about several miles northwest of the WSA.

Mineral setting:

The area is underlain largely by stightly tilted rhyolitic to basaltic volcanic rocks of Oligocene and Miocene(?) age. Some of these rocks are hydrothermally altered, whereas others were altered by reaction with groundwater. Granodiorite to quartz monzonite of Cretaceous age and metasedimentary rocks of probable Mesozoic and Paleozoic age are exposed locally in the northwestern part of the study area. A few landslide masses are present along the west side of the Black Rock Range.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 32,329 acres that constitute the balance. The Copper Canyon area should be studied in detail to determine what resources are present.

- Higgins, L.R., Earnest, D.F., and Cox, A.D., 1988, Nevada BLM Wilderness Study Areas mineral potential handbook: Nevada Mining Association, Reno, Nevada, 257 p.
- Noble, D.C., Plouff, Donald, Bergquist, J.R., Barton, H.N., and Olson, J.E., 1987, Mineral Resources of the Pahute Peak Wilderness Study Area, Humboldt County, Nevada: U.S. Geological Survey Bulletin 1726-C, 12 p.
- Olson, J.E., 1986, Mineral resources of the Pahute Peak Wilderness Study Area, Humboldt County, Nevada: U.S. Bureau of Mines Open-File Report MLA 13-86, 20 p.
- Willden, Ronald, 1964, Geology and mineral deposits of Humboldt County, Nevada: Nevada Bureau of Mines Bulletin 59, 154 p.



Mineral resources of the Pahute Peak Wilderness Study Area.

EXPLANATION

The second	Area with high mineral resource potential
***************************************	Area with moderate mineral resource potential
	Area with low mineral resource potential

See appendix for definition of levels of mineral resource potential and certainty of assessment

Commodities

Ag	Silver
Au	Gold
Cu	Copper
Hg	Mercury
Mo	Molybdenum
Pb	Lead
U	Uranium
W	Tungsten
Zn	Zinc

[] Deposit types

1	Geothermal water
2	Epithermal base- and precious-metal vein deposits
3	Hot-spring low-grade gold
4	Porphyry base metals
5	Zinc-bearing skarn
6	Replacement
7	Volcanic-hosted gold
8	Epithermal mercury
9	Volcanogenic uranium

Geologic map units

Qac	Alluvium and colluvium (Quaternary)Locally includes lake sediments and sand dunes
QI	Landslide deposits (Quaternary)Locally includes colluvium, alluvium, and talus
าา	Rhyolite, dacite, and basalt (Miocene? and Oligocene) Includes interbedded tuffs and volcaniclastic sedimentary rock
Та	Rhyolite ash-flow and air-fall tuffs (Oligocene)Ashdown Tuff and local units of volcaniclastic sedimentary rock
Tr	Rhyolite (Oligocene)Domes, short flows, and dikes
Ть	Basalt (Oligocene)Flows, dikes, and sills with interbeds of tuff and volcaniclastic sedimentary rocks
MzPzg	Granitic and metasedimentary rocks (Mesozoic and Palcozoic?)— Includes quartz monzonite and granodiorite of Cretaceous age and locally metamorphosed limestone and other sedimentary rocks that may range from Mississippian to Cretaceous age
	ContactDashed where approximately located
•	FaultDashed where approximately located; dotted where con- cealed. Bar and ball on downthrown side
~	Proceed

Explanation, mineral resources of the Pahute Peak Wilderness Study Area.

Area number:

Palisade Mesa NV-060-142/162

Size (acres):

99,550 of which 66,110 were studied at the request of the U.S. Bureau of Land Management.

Status of mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Diggles and others, 1986)

Identified mineral resources (known):

No metallic mineral or oil and gas resources were identified. Basalt and cinders in the Lunar Crater Volcanic Field are sources of crushed stone.

Mineral resource potential (undiscovered): The Palisade Mesa Wilderness Study Area has low mineral resource potential for gold, silver, copper, lead, and manganese associated with caldera collapse. There is no evidence to indicate that alteration or mineralization of older collapse structures in the study area has taken place. This geologic environment is permissive for epithermal goldsilver-copper-lead-manganese mineralization similar to that occasionally associated with caldera fracture systems elsewhere in Nevada. However, McKee (1979) points out that such mineralization is usually the result of later hydrothermal-fluid circulation taking place along the pre-existing structure. There is low potential for oil and gas resources.

Mining activity: No mining claims are present and no evidence of mining activity or prospecting was observed in the study area.

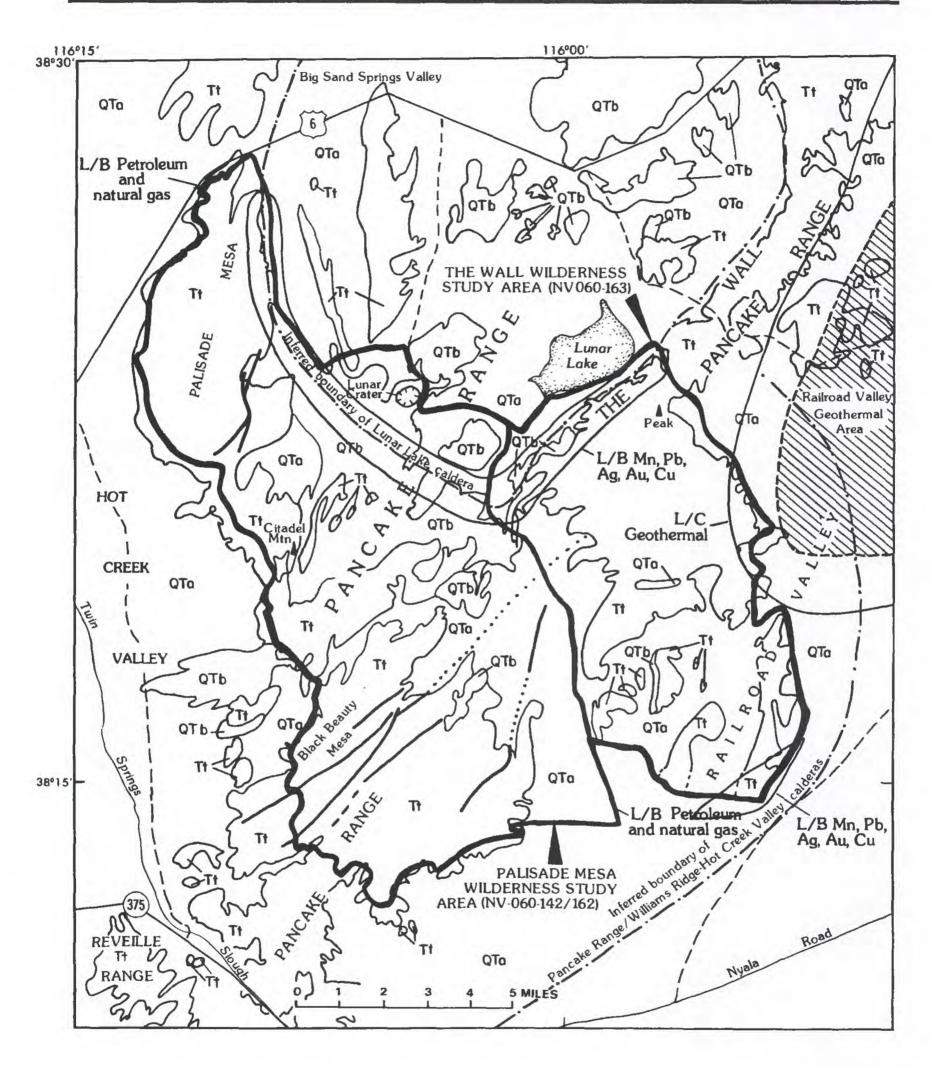
Mineral setting:

Silicic volcanic rocks of Tertiary age, basaltic flows of Tertiary and Quaternary age, and sediments of Tertiary and Quaternary age are the dominant age are the dominant stratigraphic units of the Palisade Mesa Wilderness Study Area. The oldest rocks in the study area are 27 to 7 Ma (Ekren and others, 1971) and comprise thick sequences of felsic ash-flow tuffs. These are overlain by basaltic flows of the Lunar Crater volcanic field that range in age from 3.8 to 0.13 Ma (Turrin and others, 1985). About one third is covered with alluvium and colluvium deposited on pediment surfaces and with valley-fill, lake, and landslide deposits. There are two inferrred caldera boundaries within and near the wilderness study area:

The Pancake Range/Williams Ridge-Hot Creek Valley caldera boundary (Ekren and others, 1976), which lies outside of and encircles the wilderness study area; and the more striking structure known as The Wall, which Scott (1969) mapped at the edge of Lunar Lake caldera.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 33,440 acres that constitute the balance.

- Diggles, M.F., Nash, J. Thomas, Ponce, D.A., Donald Plouff, and Kness, R.F., 1986, Mineral resources of the Palisade Mesa and The Wall Wilderness Study Areas, Nye County, Nevada: U.S. Geological Survey Bulletin 1731-B, p. B1-B12.
- Ekren, E.B., Anderson, R.E., Rogers, C.L., and Noble, D.C., 1971, Geology of Northern Nellis Air Force Base Bombing and Gunnery Range, Nye County, Nevada: U.S. Geological Survey Professional Paper 651, 91 p.
- Ekren, E.B., Bucknam, R.C., Carr, W.J., Dixon, G.L., and Quinlivan, W.D., 1976, East-trending structural lineaments in central Nevada: U.S. Geological Survey Professional Paper 986, 16 p.
- Ekren, E.B., Rogers, C.L., and Dixon, G.L, 1973, Geologic and Bouguer gravity map of the Reveille Quadrangle, Nye County, Nevada: U.S. Geological Survey Miscellaneous Geologic Investigations Map I-806, scale 1:48,000.
- Kness, R.F., 1985, Mineral investigation of Palisade Mesa and The Wall Wilderness Study Areas, Nye County, Nevada: U.S. Bureau of Mines Open-File Report MLA 26-85, 27 p.
- McKee, E.H., 1979, Ash-flow sheets and calderas: their genetic relationship to ore deposits in Nevada, in Chapin, C.E., and Elston, W.E., eds., Ash-flow tuffs: Seological Survey America Special Paper 180, p. 205-211.
- Scott, D.H., 1969, Geology of the southern Pancake Range and Lunar Crater volcanic field, Nye County, Nevada: unpublished Ph.D. thesis, University California-Los Angeles, 128 p.
- Scott, D.H., and Trask, N.J., 1971, Geology of the Lunar Crater volcanic field, Nye County, Nevada: U.S. Geological Survey Professional Paper 599-I, 22 p.
- Snyder, R.P., Ekren, E.B., and Dixon, G.L., 1972, Geologic map of the Lunar Crater quadrangle, Nye County, Nevada: U.S. Geological Survey Miscellaneous Geologic Investigation Map I-700, scale 1:48,000.
- Turrin, B.D., Renne, P.R., and Dohrenwend, J.C., 1985, Temporal trends in the chemical evolution of megacryst-bearing, subalkaline-alkaline basaltic lavas from the Lunar Crater volcanic field, Nye County, Nevada: [abs] Geological Society of America Abstracts with Programs, v. 17, n. 6, p. 14.



Mineral resources of the Palisade Mesa Wilderness Study Area.

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EXPLANATION AREA WITH LOW RESOURCE POTENTIAL-Commodities as shown. See appendix 1 and figure 3 for definition of levels of mineral resource potential COMMODITIES Petroleum and natural gas Geothermal Silver Ag Gold Au Cu Copper Mn Manganese Pb Lead CORRELATION OF MAP UNITS QUATERNARY AND TERTIARY Pleistocene and Pliocene QTb Unconformity TERTIARY Tt - Miocene and Oligocene **DESCRIPTION OF MAP UNITS** Alluvium (Holocene, Pleistocene, and Pliocene) Basalt (Pleistocene and Pliocene) **QTb** Tt Tuff (Oligocene and Miocene) MAP SYMBOLS ---- Contact-Dashed where approximately located ---- Fault-Dashed where approximately located; dotted where concealed Boundary of Railroad Valley geothermal area -- Inferred caldera boundary

Geology from Ekren and others (1972) and Ekren and others (1973).

---- Dirt road

Park Range

Area number:

NV-040-154

Size (acres):

47,268 of which 46,831 were studied at the request of the U.S. Bureau of

Land Management.

Status of

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of mineral surveys:

Mines (Brooks and others, 1987).

Identified mineral resources (known):

No mineral resources have been identified in the wilderness study area. Extensive areas of sand and gravel occur within the WSA. However, the distance to markets combined with the abundance of these commodities in the region prevent these materials from being classified as identified

resources.

Mineral resource potential (undiscovered): The mineral resource potential for undiscovered gold, silver, mercury, and arsenic is moderate in the altered, brecciated, and faulted sedimentary rocks exposed in the northern part of the study area and extending north of the study area boundary. However, the mineral resource potential for these metals in the rest of the study area is low based on the absence of secondary silicification and hydrothermal alteration in the Tertiary volcanic rocks that constitute most of the study area. The mineral resource potential for all other metals in the study area is also low. The resource potential for oil and gas and geothermal energy is low. However, oil and gas leases extend into the northern part of the study area. Occurrences of sand and gravel are too remote and inaccessible to have any significant resource potential.

Mining activity: No production has been reported from the WSA. There was some geochemical and geological exploration occurring in the area in 1989.

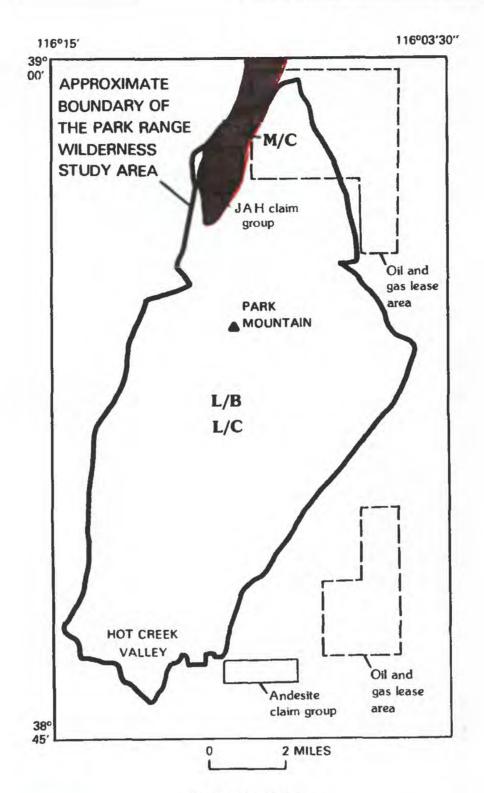
July 1989 BLM records show 107 claims in the area. These were located by three major gold mining companies and several individuals. The companies are Lana Resources U.S. Incorporated, Asarco Incorporated, and Amelsco Exploration Incorporated.

Mineral setting:

Tertiary (see geologic time chart) volcanic rocks that include intermediatecomposition lavas and ash-flow tuffs constitute most of the rock exposed in the Park Range. Paleozoic sedimentary rocks that have been faulted and silicified and contain anomalous concentrations of gold, silver, arsenic, and mercury are exposed in a small, wedge-shaped area in the northern part of the wilderness study area.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 437 acres that constitute the balance. The northern part of the study area warrants additional study. Target areas should be carefully mapped and sampled in detail. Areas having anomalous values of gold, silver, arsenic, or mercury could be further delineated by drilling.

- Brooks, W.E., Tucker, R.E., Goodhue, C., Day, G.W., Plouff, D., Duval, J.S., Johnson, F.L., and Benjamin, D.A., 1987, Mineral Resources of the Park Range Wilderness Study Area, Nye County, Nevada: U.S. Geol. Survey Bull. 1731-F, 9 p.
- Hose, R.K., 1983, Geologic Map of the Cockalorum Wash Quadrangle, Eureka and Nye Counties, Nevada: U.S. Geol. Survey Miscellaneous Investigations Series Map I-1410.
- Johnson, F.L., and Benjamin, D.A., 1986, Mineral Resources of the Park Range Wilderness Study Area, Nye County, Nevada: U.S. Bureau of Mines Open File Report MLA 25-86, 13 p.
- Kleinhampl, F.J. and Ziony, J.I., 1984, Mineral Resources of Northern Nye County, Nevada: Nevada Bureau of Mines and Geology Bull. 99 B, 243 p.



EXPLANATION



Geologic terrane having moderate mineral resource potential for gold, silver, arsenic, and mercury, with certainty level C

L/B Geologic terrane having low mineral resource potential for oil and gas, with certainty level B

L/C Geologic terrane having low mineral resource potential for all metals, except as noted above, and geothermal energy, with certainty level C

Mineral resources of the Park Range Wilderness Study Area.

Parsnip Peak NV-040-206

Area number: Size (acres):

88,175 of which 53,650 were studied at the request of the U.S. Bureau of

Land Management.

Status of

mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of

Mines (Toth and others, 1987).

Identified mineral resources (known):

An inferred resource of 4 million tons of perlite was calculated for outcrops along the western boundary of the study area. Densities of expanded perlite samples from these outcrops range from 3.9 to 8.2 pounds per cubic foot which should produce an acceptable concrete and

plaster aggregate.

Mineral resource potential (undiscovered):

A small area of limestone and dolomite on the western side of the wilderness study has high mineral resource potential for arsenic, antimony, mercury, and gold. The rest of the Parsnip Peak Wilderness Study Area has low mineral resource potential for metals, oil and gas, coal, and geothermal energy. The mineral resource potential for perlite is moderate in the rhyolite volcanic rock that occurs along the western side of the study area.

of the study area.

Mining activity:

In July 1984, mining activity within the WSA consisted of assessment work on two groups of claims, the Blue Rock placer claims and the Gold Tower lode claims. Over 250,000 tons of perlite have been produced by open-pit methods from the Hollinger pit, approximately 1 mi west of the WSA. This mine was inactive in July 1984.

Mineral setting:

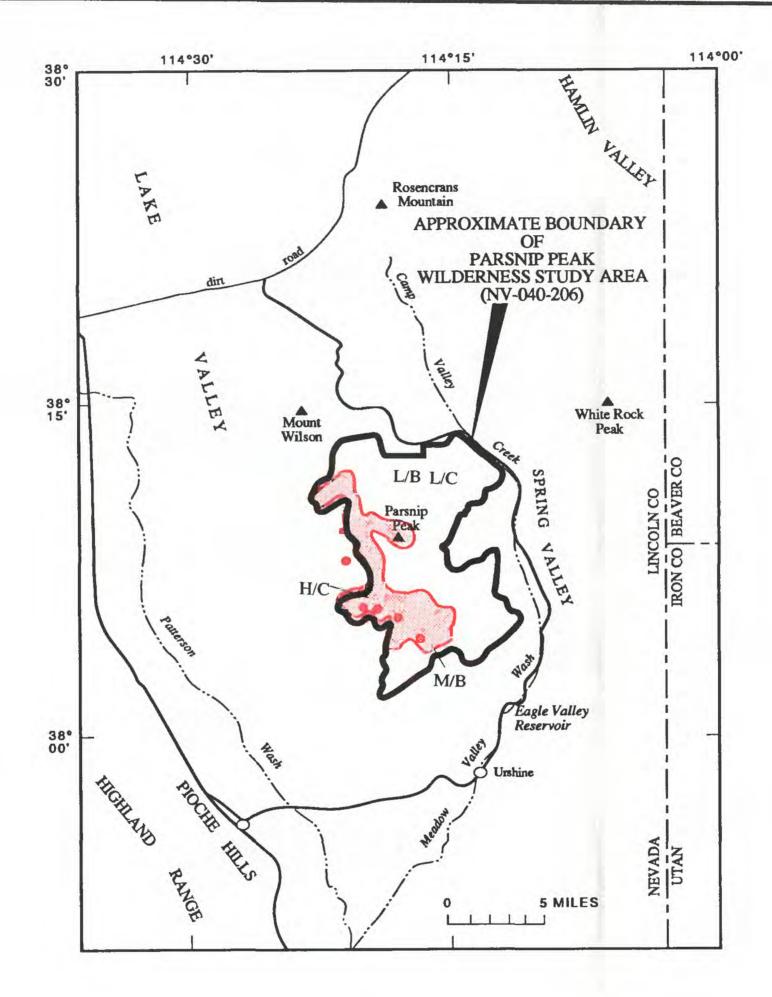
The study area is along the eastern margin of the Basin and Range phsiographic province and is within the Blue Ribbon lineament of Rowley and others (1978). A thick section of Miocene (see the geologic time chart) silicic volcanic rocks underlies the central and western parts of the area; the section consists of the Bauers and Swett Tuff Members of the Condor Canyon Formation, overlain by ash-flow tuffs and rhyolite flows of the Blawn Formation. Lake sediments of the Pliocene panaca Formation occur along the east side of the area and consist of flat-lying tuffaceous siltstone, mudstone, and fine-grained sandstone, mudstone, and fine-grained sandstone. Extensive colluvial deposits of Quaternary age are developed along the eastern and western flanks of the area. A small outcrop of altered Cambrian limestone and dolomite occurs along a fault on the western margin of the area.

Normal faults cross the study area and tend mostly northwest, although a few north-trending faults are present. Offsets range from a few tens of feet to several hundred feet. none of the faults cut Quaternary deposits.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 34,457 acres that constitute the balance. More surface and subsurface sampling is needed to determine if a gold or silver resource exists on the Gold Tower claims.

References:

- Cochran, K.L., 1951, Perlite resources, Meadow Valley Wash area, Clark and Lincoln Counties, Nevada; Beaver and Milland Counties, Utah: Union Pacific Railroad Company, 24 p.
- Gese, D.D., 1985, Mineral resources of the Parsnip Peak Wilderness Study Area (NV-040-206), Lincoln County, Nevada: U.S. Bureau of Mines Open-File Report MLA 42-85, 22 p.
- Toth, M.I., Stoneman, R.G., Blank, H.R., and Gese, D.D., 1987, Mineral resources of the Parsnip Peak Wilderness Study Area, Linclon County, Nevada: U.S. Geological Survey Bulletin 1728-D, 13 p.
- Tschanz, C.M., and Pampeyan, E.H., 1970, Geology and mineral deposits of Lincoln County, Nevada: Nevada Bureau of Mines Bulletin 73, 188 p.
- Wallace, A.R., Turner, R.J., Grauch, V.J.S., Plesha, J.L., and U.S. Bureau of Mines, 1987, Mineral resources of the Rough Hills Wilderness Study Area, Elko County, Nevada: U.S. Geological Survey Bulletin 1725-D, 10 p.



Mineral resources of the Parsnip Peak Wilderness Study Area.

EXPLANATION

H/C	Geologic terrane having high mineral resource potential for arsenic, antimony, mercury, and gold, with certainty level C
M/B	Geologic terrane having moderate mineral resource potential for perlite, with certainty level B
L/B	Geologic terrane having low mineral resource potential for metals and geothermal energy, with certainty level B—Applies to entire study area
L/C	Geologic terrane having low mineral resource potential for oil, gas, and coal, with certainty level C—Applies to entire study area

Area number:

Pigeon Spring NV-060-350

Size (acres):

3,575



Status of

mineral surveys:

This area was not studied by the U.S. Bureau of Mines or the U.S.

Geological Survey.

Identified mineral resources (known):

No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential

(undiscovered):

There is moderate mineral resource potential for placer gold in old stream channels in the alluvium near Cucomungo Spring on the eastern edge of the area. The area has low potential for skarn-related talc, tungsten and molybdenum mineralization in the contact zone between the Mesozoic

granitic rocks and the Precambrian carbonate rocks.

Mining activity: There are no active mines within the WSA but much of the area is within the Sylvania mining district. July 1989 BLM mining records show 120 active and 99 inactive claims within or adjacent to the WSA.

Mineral setting:

Most of the area is underlain by Jurassic granitic rock of the Sylvania pluton. This granitic rock intrudes Precambrian metasedimentary rocks that are mostly dolomite or limestone. Locally skarns are formed at this contact. Late Tertiary or Quaternary basalt lava flows lie on the granite or limestone in the NE part of the area.

Recommendations: Shallow pits in the alluvium might define old gravel filled channels with placer gold. The contact between alluvium and bedrock might be defined by shallow low energy seismic techniques. This Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey.

References:

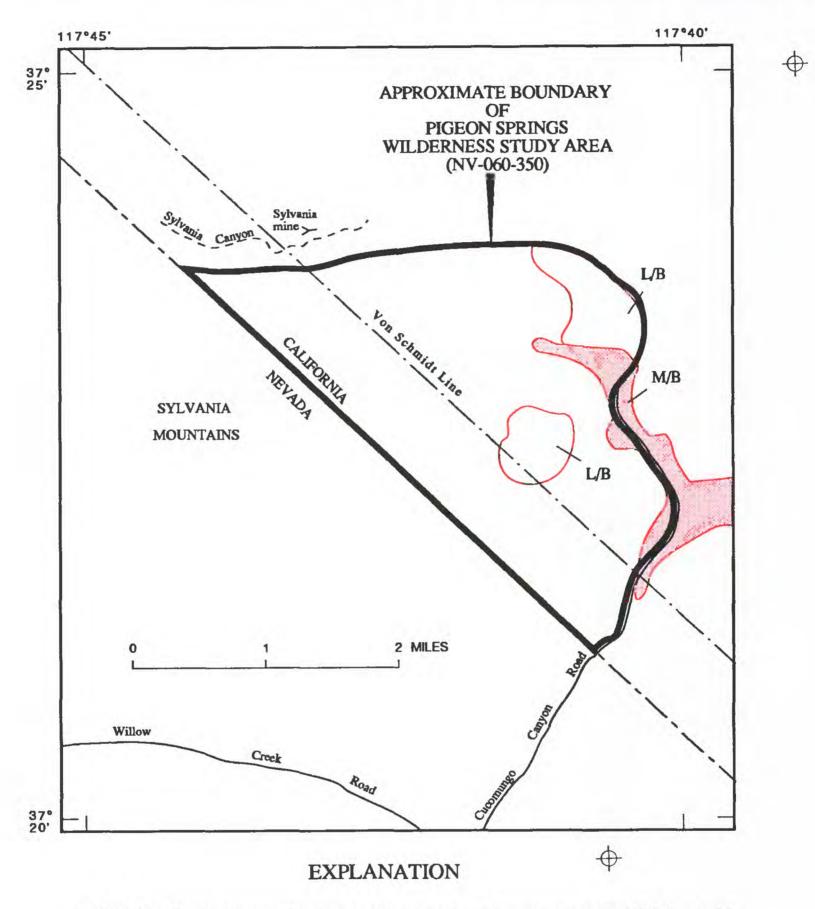
Great Basin GEM Joint Venture, 1983, Pidgeon Spring G-E-M Resources Area (GRA No. NV.-20) Technical Report (WSA NV-050-0350): Prepared for the U.S. Bureau of Land Management (contract YA-553-RFP2-1054), 28 p.

McKee, E.H., 1968, Geology of the Magruder Mountain area, Nevada-California: U. S. Geological Survey Bulletin 1251-H, 40 p.

McKee, E.H., 1985, Geologic map of the Magruder Mountain Quadrangle, Esmeralda County Nevada, and Inyo County, California: U.S. Geological Survey GQ-1587, Scale 1:62,500.

Nevada Mining Association, 1988, Nevada BLM Wilderness Study Areas, Mineral Potential Handbook: unpublished report.





M/B Geologic terrane having moderate mineral resource potential for gold with certainty level B

L/B Geologic terrane having low mineral resource potential for talc, tungsten, and molybdenum with certainty level B

Mineral resources of the Pigeon Spring Wilderness Study Area.

Pine Creek

Area number:

NV-050-414/NV-000-ISA2

Size (acres):

24,618

Status of

mineral surveys:

This wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines

(Bohannon and Morris, 1983).

Identified mineral resources (known):

No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential (undiscovered):

As of 1988, there were 12 oil and gas leases that covered about 95% of the wilderness study area, and applications for leases were pending for the remaining 5%. The area is considered to have low potential for oil and gas in Paleozoic carbonate and sandstone strata. Evidence suggests that mineralizing fluids did not migrate along thrust faults into this area from the nearby Goodsprings mining district, and there is no evidence of potential for metallic mineral resources in the study area. Gypsum occurs in the study area, but because of its great depth (5000 ft) and the available nearby gypsum, the area is considered to have no potential for gypsum

resources (Bohannon and Morris, 1983).

Mining activity:

There are no known active mines within the WSA. The Goodspring mining district is 12 miles south of the WSA. The Blue Diamond mine,

about 5 miles east of the WSA, produced gypsum.

July 1989 BLM records show 52 active and 10 inactive claims within or

adjacent to the WSA.

Mineral setting:

The study area is situated in the rugged Sandstone Bluffs area of the Spring Mountains west of Las Vegas. Geologically, the area consists of a relatively undeformed series of Paleozoic sedimentary strata. The section includes rocks of Cambrian through Permian age, with only the Silurian missing. Rock types include marine-carbonate rocks (limestone and dolomite), nonmarine limestone, nonmarine clastic and gypsiferous rocks, and eolian sandstone. The sedimentary strata have been broken by a series of normal and thrust faults (Bohannon and Morris, 1983).

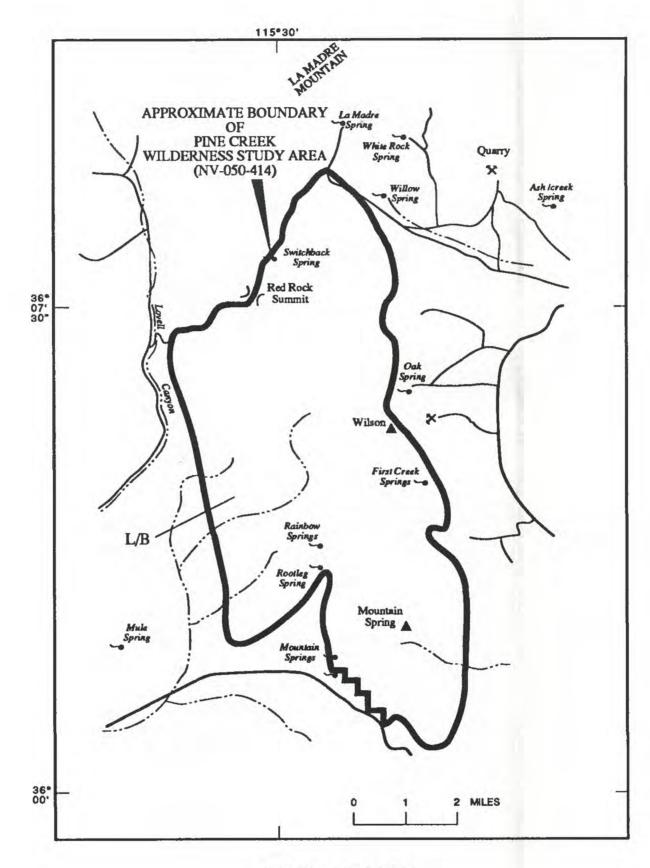
Recommendations: No further work is recommended.

References:

Bohannon, R.G., and Morris, R.W., 1983, Geology and mineral resources of the Red Rocks Escarpment Instant Study Area, Clark County, Nevada: U.S. Geological Survey Miscellaneous Field Studies Map MF-1522.

Burchfiel, B.C., Fleck, R.J., Secor, D.J., Vincelette, R.R., and Davis, G.A., 1974, Geology of the Spring Mountains, Nevada: Geological Society of America Bulletin, v.85, p 103-1022.

- Great Basin GEM Joint Venture, 1983, La Madre Mountains/Pine Creek G-E-M Resources Area (GRA No. NV.-32) Technical Report (WSAs NV-050-0412 and 050-0414): Prepared for the U.S. Bureau of Land Management (contract YA-554-RFP2-1054): 34 p.
- Hewett, D.F., 1931, Geology and ore deposits of the Goodsprings quadrangle, Nevada: U.S. Geological Survey Professional Paper 162, 172 p.
- Longwell, C.R., Pampeyan, E.H., Bowyer, Ben, and Roberts, R.J., 1965, Geology and mineral deposits of Clark County, Nevada: Nevada Bureau of Mines Bulletin 62, 218 p.
- Nevada Mining Association, 1988, Nevada BLM Wilderness Study Areas, Mineral Potential Handbook: unpublished report.



EXPLANATION

L/B Geologic terrane having low mineral resource potential for oil and gas with certainty level B

Mineral resources of the Pine Creek Wilderness Study Area.

Area number:

Pole Creek NV-020-014A

Size (acres):

12,969

Status of

mineral surveys:

This area has not been studied by the U.S. Bureau of Mines or the U.S.

Geological Survey.

Identified mineral

resources (known):

No mineral resources have been identified in the Wilderness Study Area.

Extensive areas of rock and sand and gravel occur within the WSA. However, the distance to markets combined with the abundance of these commodities in the region prevent these materials from being classified

as identified resources.

Mineral resource potential

(undiscovered):

The Pole Creek Wilderness Study Area has moderate mineral resource potential for gold, silver, and lead in vein deposits. There is low mineral resource potential for copper in pyrrhotite and chalcopyrite as well as for traces of nickel. Occurrences of sand and gravel in the study area are too

inaccessible and remote to have any significant resource potential.

Mining activity:

The Wild Horse Mine is a past producer of gold and silver. Copper and nickel values have been reported from the Gabbro property, but no production is known.

July 1989 BLM records show 13 lode and 1 placer claim in the WSA.

Mineral setting:

The Pole Creek Wilderness Study Area, in the Fox Range, is underlain by metamorphosed Triassic and Jurassic rocks of the Nightingale Sequence in the center of the study area. These rocks consist of metamorphosed sedimentary rocks, slate, phyllite, hornfels, calcsilicate hornfels, tactite, recrystallized limestone and dolomite, quartzite and schist. The Nightingale Sequence is intruded in the east by Cretaceous granodiorite that is medium to coarse grained with plagioclase, microcline, quartz, hornblende, and biotite. The Miocene Pyramid Sequence, part of the Hartford Assemblage, overlies much of the area. This sequence consists of basalt, andesite, and dacite flows, flow breccias, and mud-flow breccias. It is commonly propylitized and locally bleached. There are upper Miocene to Pliocene basalt flows that crop out in the western side of the study area.

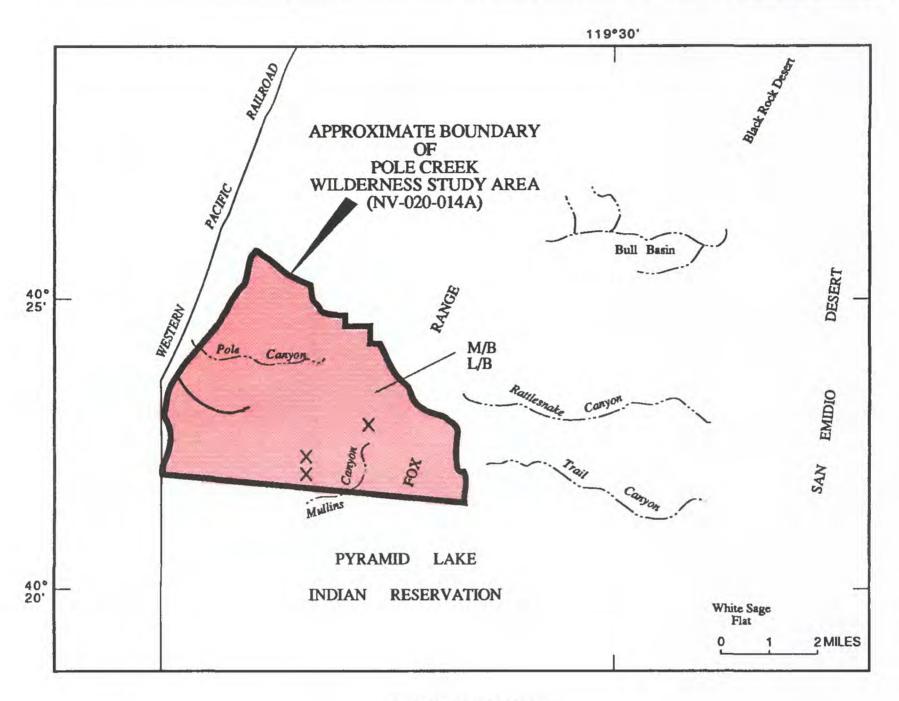
Recommendations:

The Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey.

References:

Bonham, H.F., Jr., 1969, Geology and mineral deposits of Washoe and Storey Counties, Nevada, with a section on industrial rock and mineral deposits by K.G. Papke: Nevada Bureau of Mines and Geology Bulletin 70, 140 p.

- Bonham, H.F. and Papke, K.G., 1969, Geology and Mineral Deposits of Washoe and Storey Counties, Nevada: Nevada Bureau of Mines and Geology Bull. 70, 140 p.
- Overton, T.D., 1947, Mineral Resources of Douglas, Ormsby and Washoe Counties: Nevada Bureau of Mines and Geology Bull. 46, 91 p.



EXPLANATION

- M/B Geologic terrane having moderate mineral resource potential for gold, silver, and lead with certainty level B
- L/B Geologic terrane having low mineral resource potential for copper, and nickel with certainty level B

Mineral resources of the Pole Creek Wilderness Study Area.

Area number: Size (acres): Poodle Mountain NV-020-012 142,050

Status of

mineral surveys:

This area has not been studied by the U.S. Bureau of Mines or the

U.S. Geological Survey.

Identified mineral resources

(known):

No mineral resources have been identified in the Wilderness Study Area.

Along the Gerlach-Cedarville road about 18 miles northwest of Gerlach, and, therefore, presumably within the northwestern portion of the WR claims and private lands, andesites contain small, dark lenses enriched in titanium-bearing magnetite and magnetite (Beal, 1963, p. 23). Gullies and watercourses draining the area also contain minor placer (black sand) deposits of these minerals. Irregular masses of perlite are reported to be associated with the volcanic rocks in the area (Beal, 1963, p. 25).

Extensive areas of sand and gravel occur within the WSA. However, the distance to markets combined with the abundance of these commodities in the region prevent these materials from being classified as identified resources.

Mineral resource potential (undiscovered):

The study area has moderate mineral resource potential for gold, silver, copper, lead, and zinc as lode deposits, moderate mineral resource potential for titanium and iron resources as placer deposits, and moderate mineral resource potential for perlite, clay, zeolite, and pozzolan. Occurrences of sand and gravel in the study area are too inaccessible and remote to have any significant resource potential.

Mining activity:

The Last Stand claim is an inactive titanium-iron placer operation in the WSA. Production is not known. The Copper King is an inactive copper-tungsten claim. No production is reported from it.

July 1989 BLM records show 40 claims in the WSA. The Great Eagle claim block is for uranium; the commodity of interest on the other claims in unknown.

Mineral setting:

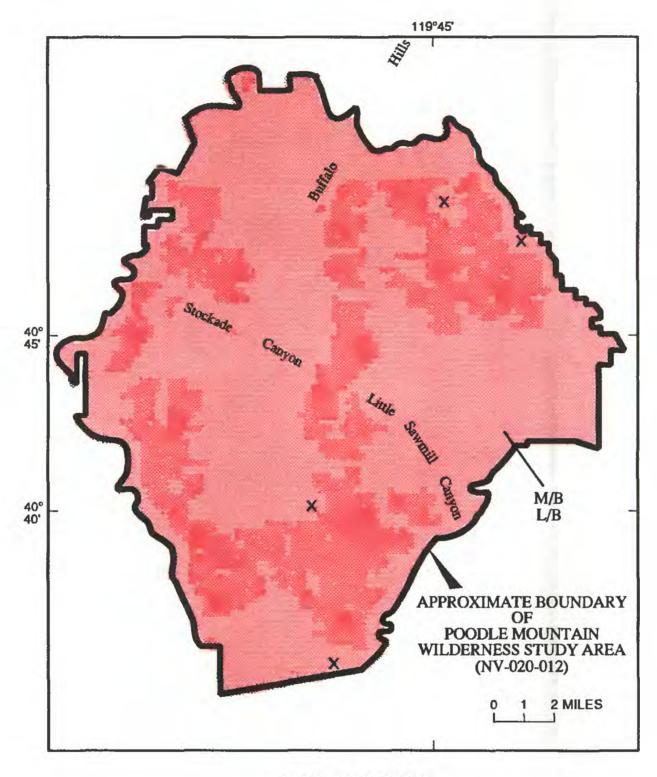
Most of the area is covered by late Tertiary olivine basalt flows erupted from several centers, including a shield volcano that forms Poodle Mountain. Along the flanks of the area patches of sedimentary rock and associated tuff underlie the basalt. In the southern part of the area are relatively small outcrops of Paleozoic or Mesozoic metasedimentary and metavolcanic rocks intruded by Cretaceous granite.

Recommendations: Geophysical studies are needed to determine the thickness of the basalt flows, and the feasibility of exploring for hidden deposits below the basalt. Geochemical sampling of pre-Tertiary metamorphic and granitic rocks in the southern part of the area and of Tertiary sedimentary rocks on the flanks of the area are needed to fully evaluate the mineral resource potential. The Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey.

References:

Beal, L.H., 1963, Investigation of titanium occurrences in Nevada: Nevada Bureau of Mines Report 3, p. 23-25.

Bonham, H.F., 1969, Geology and mineral deposits of Washoe and Storey Counties, Nevada: Nevada Bureau of Mines and Geology Bulletin 70, 140 p.



EXPLANATION

- M/B Geologic terrane having moderate mineral resource potential for gold, silver, copper, lead, zinc, titanium, iron, perlite, clay, zeolite, and pozzolan with certainty level B
- L/B Geologic terrane having low mineral resource potential for gold, silver, lead, zinc, copper, tungsten, uranium, lithium, borates, diatomite, and geothermal energy with certainty level B

Mineral resources of the Poodle Mountain Wilderness Study Area.

Pueblo Mountains

Area number:

NV-020-642/OR-002-081

Size (acres):

69,310 of which 41,315 were studied at the request of the U.S. Bureau of

Land Management.

Status of mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey

and the U.S. Bureau of Mines (Roback and others, 1987).

Identified mineral resources (known):

Mineral resources within and near the WSA include vein and disseminated gold (exact tonnage data not available), disseminated copper and associated molybdenum (drill data unavailable), vein copper, geothermal energy, zeolites, diatomite, sand and gravel, and stone. At least 1000 tons each of zeolite and diatomite, and several thousand tons of sand and gravel and stone resources occur in or within one mile of the WSA.

Mineral resource potential (undiscovered):

There is high potential for silver and mercury resources in altered rocks located along two northwest-trending fault zones that cross the east boundary of the study area; moderate potential for gold, silver, copper, mercury, and molybdenum resources in quartz veins along a fault near the east boundary of the study area; low potential for silver, zinc, mercury, and molybdenum resources in intermediate flows located in the central part of the study area; and low potential for undiscovered silver and mercury in silicic tuff. The eastern part of the study area has low potential for copper, lead, and zinc resources in metavolcanic and metasedimentary rocks; and the northeast part of the study area has low potential for mercury resources in mafic flows. The resource potential for zeolites, diatomite, oil, gas, and geothermal energy is considered low in the study area.

Mining activity:

The Pueblo Mining District is situated within and east of the east half of the WSA. Prospecting and mining began in 1894 and at least 66 mines and prospects, encompassing more than 600 lode mining claims, have been located with over 200 active claims (BLM records, July 1989). Disseminated and vein gold, and mercury are commodities of primary interest; vein copper and porphyry copper/molybdenum deposits are also of interest. The southern part of the study area was drilled, in the mid-1970's, for a porphyry copper deposit.

Current exploration in and near the WSA for disseminated gold includes at least four mining companies with active claim blocks (Inspiration Development Co., ECM Inc., Lake Fork Resources, and Red Arrow Resources); numerous prospects are also active. At least 17 other mining companies have examined the area in 1989. Non-metallic mineral commodities explored for include zeolite, diatomite, sand and gravel, and stone.

Mineral production includes minor placer gold, less than 25 oz of lode gold, one rail car load of copper ore, and less than 500 lbs of mercury. Minor quantities of zeolites have been produced.

Disseminated gold exploration has focused on areas of structural deformation, caldera environments, rhyolite plugs and flows, areas with historic base or precious metal production or mercury occurrences, and favorable volcanic lithologies.

Mineral setting:

The Pueblo Mountains comprise part of a north-trending fault block in the northwestern Basin and Range physiographic province. The east flank of the Pueblo Mountains is very steep, while the west flank dips gently to the west. Van Horn and Little Cottonwood Creeks divide the range into two parallel, north-trending crests. Metamorphosed volcanic, plutonic, and sedimentary rocks of Jurassic age are the oldest rocks in the range. They are intruded by a granodioritic pluton of probable Cretaceous age. The pre-Tertiary rocks are overlain unconformably by Tertiary sedimentary and volcanic rocks.

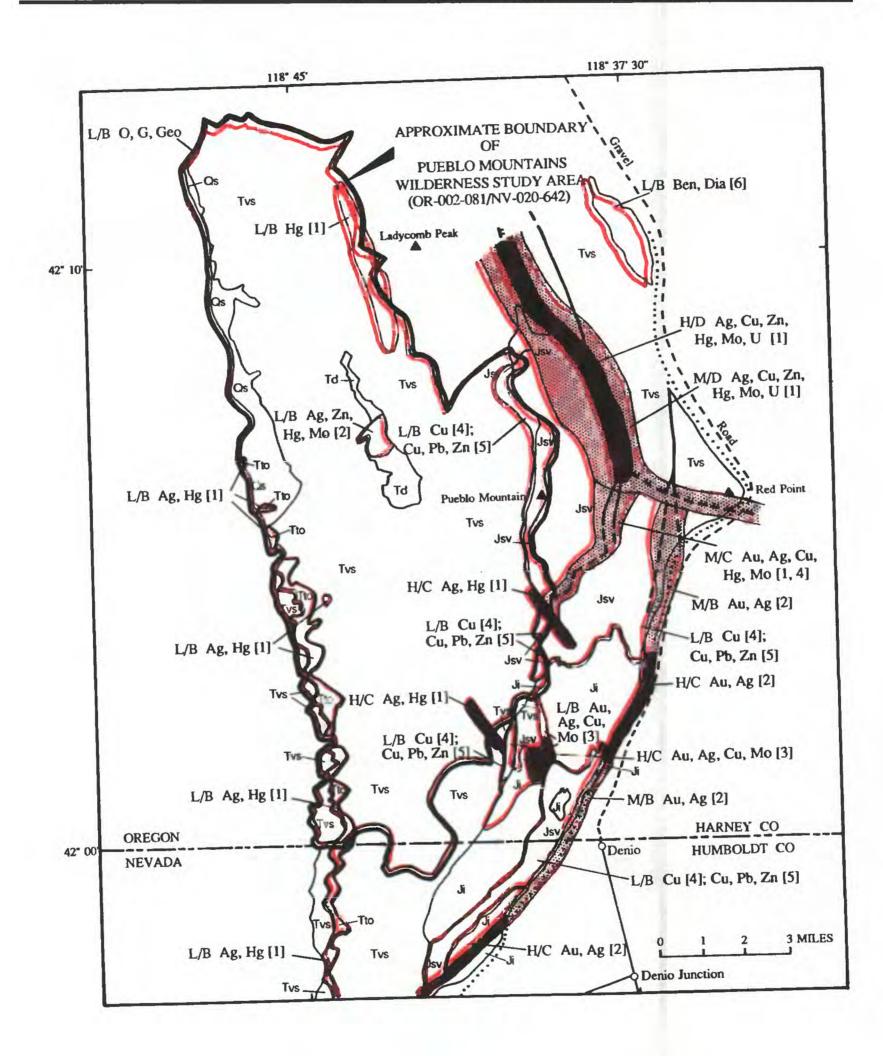
Recommendations:

As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 27,995 acres that constitute the balance. Detailed examination of both the western and eastern slope of the Pueblo Mountain range to evaluate reported gold anomalies; evaluate the eastern slope of the range for lithium, uranium, or molybdenum associated with the nearby Pueblo Caldera; examine the prospects and alteration in the south end of the WSA for gold, or base metals, especially porphyry copper; and additional examination of the western slope for additional diatomite and zeolite occurrences.

References:

- Brooks, H.C., 1963, Quicksilver in Oregon: Oregon Department of Geology and Mineral Industries Bulletin 55, 223 p.
- Gray, J.J., Peterson, N.N., Clayton, Janine, and Baxter, Gary, 1983, Geology and mineral resources of 18 BLM wilderness study areas, Harney and Malheur Counties, Oregon: Oregon Department of Geology and Mineral Industries OFR O-83-2, 106 p.
- Hyde, John, 1979, An Overview of Geothermal Exploration and Development in Nevada, in Newman, G., W., and Goode, H.D., eds., Basin and Range Symposium and Great Basin Field conference: Rocky Mountain Association of Geologists, Denver, Colorado, p. 381-388.
- Munts, S.R., and Willett, S.L., 1987, Mineral Resources of the Pueblo Mountains Study Area, Harney County, Oregon and Humboldt County, Nevada: U.S. Bureau of Mines Open-File Report MLA 08-87, 40 p.
- Newton, V.C., 1982, Geology, energy, and minerals resources assessment, BLM Region I, Columbia Plateau: prepared for TerraData, 7555 West Tenth Avenue, Lakewood, CO, 17 p.

- Roback, R.C., Vander Muelen, D.B., King, H.D., Plouff, Donald, Munts, S.R., and Willett, S.L., 1987, Mineral Resources of the Pueblo Mountains Wilderness Study Area, Harney County, Oregon, and Humboldt County, Nevada: U.S. Geological Survey Bulletin 1740-B, 30 p.
- Ross, C.P., 1942, Quicksilver deposits in the Steens and Pueblo Mountains southern Oregon: U.S. Geological Survey Bulletin 931-J, p. 227-258.
- Williams, Howell, and Compton, R.R., 1953, Quicksilver deposits of Steens Mountain and Pueblo Mountains, southeast Oregon: U.S. Geological Survey Bulletin 995-B, 381 p.



Mineral resources of the Pueblo Mountains Wilderness Study Area.

EXPLANATION

Area with high mineral resource potential Area with moderate mineral resource potential Area with low mineral resource potential See appendix for definition of levels of mineral resource potential and certainty of assessment Commodities Silver Ag Au Gold Copper Cu Hg Mercury Molybdenum Mo Pb Lead U Uranium Zn Zinc Ben Bentonite Dia Diatomite Oil and Gas O,G Geo Geothermal Types of deposits Hydrothermal caldera-related deposits 1 2 Epithermal vein deposits 3 Porphyry deposits 4 Base- and precious-metal deposits 5 Volcanogenic massive sulfide deposits 6 Sedimentary lake deposits Geologic map units Qs Tto Surficial deposits (Quaternary) Tuff of Oregon Canyon (Miocene) Td Dacite (Miocene) Tvs Volcanic and sedimentary rocks (Tertiary) Ji Intrusive rocks (Jurassic)

Explanation, mineral resources of the Pueblo Mountains Wilderness Study Area.

concealed

caldera

Contact

Jsv

44 44 44

Schist and volcanic rocks (Jurassic)

Approximate margin of Pueblo Mountains

Fault--Dashed where approximate; dotted where

Area number:

Quail Springs NV-050-411

Size (acres):

12,145



mineral surveys:

The area was not studied by the U.S. Bureau of Mines or the U.S.

Geological Survey.

Identified mineral resources (known):

No mineral resources have been identified in the Wilderness Study Area. However, the area is mapped as Quaternary alluvial fill and Las Vegas

Formation. It may be suitable for sand and gravel resources.

Mineral resource potential

(undiscovered):

In the sedimentarty sequence the potential for diatomite, gypsum and anhydrite is low. The potential for commercial-grade sand and gravel is moderate. Geothermal and oil and gas potential in the area is low.

Mining activity:

July 1989 BLM records show 18 placer claims, which were staked in the WSA in 1971 by Vega, Inc. It probable that they were for sand and

gravel.

Mineral setting:

Approximately 80% of the study area is composed of Quaternary beach sands and sand dune deposits; the remaining 20% being eroded alluvialflat, playa, and marsh deposits. Parallelling the axis of the valley is an

inferred right lateral strike-slip fault.

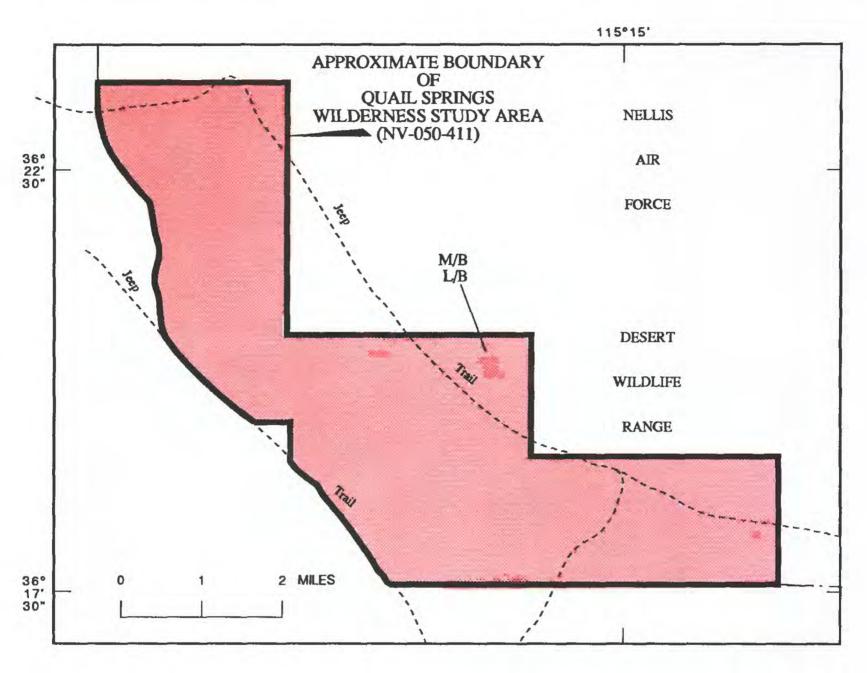
Recommendations: Detailed geologic mapping, geochemical sampling, and geophysical studies would add greatly to the understanding of the resource potential of this area. This Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the

U.S. Geological Survey.

References:

Great Basin GEM Joint Venture, 1983, Nellis/Quail Spring G-E-M resources area (GRA no. NV-35) technical report (WSA's NV-050-0411, 050-04R-15A, B, and C): Prepared for the U.S. Bureau of Land Management, contract YA-553-RFP2-1054, 33 p.

Longwell, C.R., Pampeyan, E.H., Bowyer, Ben, and Roberts, R.J., 1965, Geology and mineral deposits of Clark County, Nevada: Nevada Bureau of Mines Bulletin 62, 218 p.



EXPLANATION

M/B Geologic terrane having moderate mineral resource potential for sand and gravel with certainty level B

L/B Geologic terrane having low mineral resource potential for diatomite, gypsum, anhydrite, geothermal energy, and oil and gas with certainty level B

Mineral resources of the Quail Springs Wilderness Study Area.

Area number:

Queer Mountain NV-060-354

Size (acres):

81,550

Status of

mineral surveys:

This area was not studied by the U.S. Bureau of Mines or the U.S.

Geological Survey.

Identified mineral resources (known):

No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential (undiscovered):

Wrucke and others (1984) report that there is an area of moderate potential for silver within the Queer Mountain Wilderness Study Area surrounding the Sylvia mine; that area also has low potential for molybdenum. They also assign low potential for both metals in the nearby area. The northern part of the study area has a moderate potential for gold vein deposits in granitic rocks and in flanking metamorphosed shale and limestone. The same area has a low potential for copper and lead. There is no potential for oil and gas resources (Sandberg, 1983).

Mining activity:

A placer gold prospect, Oriental Wash, and a lode-disseminated gold prospect, Silvia mine, lie within the study area. The Juanita gold prospect lies in the adjacent Little Sand Springs (Calif.) WSA. The Independence group uranium prospect is located near the north boundary and exploration and production has occurred in the Gold Mountain/Tokop area which extends into the northern part of the WSA.

Mineral setting:

The northern part of the Queer Mountain area is underlain by Mesozoic granitic rocks and flanking metamorphosed shale and limestone. These rocks are overlain by a thick Tertiary tuff that covers most of the central and southern part of the area. The tuff is broken by widely spaced high-angle normal faults and is locally covered by Tertiary or Quaternary basalt flows.

Recommendations:

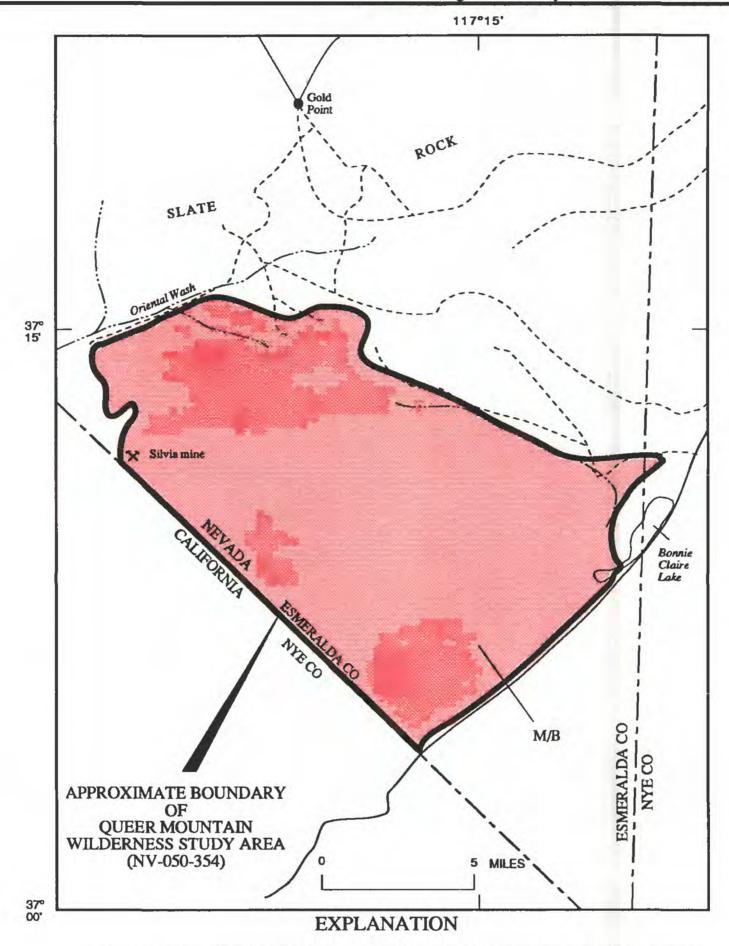
Geochemical sampling in the northern part of the area is desirable to evaluate the potential for quartz vein gold deposits. Geophysical studies are necessary to determine the thickness of the tuff in the central and southern part of the area, and to determine the feasibility of exploring for hidden deposits below the tuff. The Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey.

References:

Albers, J.P., and Stewart, J.H., 1972, Geology and Mineral Deposits of Esmeralda County, Nevada: Nevada Bureau of Mines and Geology Bulletin 78, 80 p.

Garside, L.J., 1973, Radioactive mineral occurrences in Nevada: Nevada Bureau of Mines and Geology Bulletin 81, p. 53.

- Nevada Mining Association, 1988, Nevada BLM Wilderness Study Areas, Mineral Potential Handbook: Reno, Nevada, unnumbered pages.
- Sandberg, C.A., 1983, Petroleum potential of wilderness lands in Nevada: U.S. Geological Survey Circular 902-H, 11 p.
- Wrucke, C.T., Marsh, S.P., and Miller, M.S., 1985, Reevaluation of the mineral resource potential of part of the Little Sand Springs Wilderness Study Area, Inyo County, California: U.S. Geological Survey Open-File Report 85-215, 4 p.
- Wrucke, C.T., Werschky, R.S., Rains, G.L., Blakely, R.J., Hoover, D. B., and Miller, M. S., 1984, Mineral resources and mineral resource potential of the Little Sand Springs Wilderness Study Area, Inyo County, California: U.S. Geological Survey Open-File Report 84-557, 20 p.



M/B Geologic terrane having moderate mineral resource potential for gold with certainty level B

L/B Geologic terrane having low mineral resource potential for tungsten with certainty level B

Mineral resources of the Queer Mountain Wilderness Study Area.

Rawhide Mountain

Area number: Size (acres):

mineral surveys:

NV-060-059 64,360

Status of

This area was not studied by the U.S. Bureau of Mines or the U.S.

Geological Survey.

Identified mineral resources (known):

No mineral resources have been identified within the Wilderness Study Area; however, mineral resource data are not adequate to assess possible ore body extensions into the area from mines on or near the Wilderness

Study Area boundary.

Mineral resource potential (undiscovered): There is moderate potential for silver-lead-zinc replacement and fissure mineralization in fault zones intruded by silicic dikes along the northeastern edge of the area near the Tybo district. There is low potential for geothermal energy. There is low potential for oil and gas.

There is low potential for industrial materials.

Mining activity: The Rawhide Wilderness Study Area is in the Tybo mining district, one of the principal mining districts in Nye County. Gold, silver, lead, and zinc were the main commodities produced from this district.

U.S. Bureau of Mines MILS records indicate 14 mines are located on or near the WSA boundary. July 1989 BLM records show 551 active lode claims in the WSA.

Exploration activity by Cyprus Minerals Corp., Gavilan Minerals Inc., and Nassau Ltd. is centered about 3 miles southwest of Dean Spring. Many claims are also located around and southeast of Rawhide Mountain. Mineral exploration activity has persisted in the Rawhide area for many years. Oil and gas leases are present along the east and west margins of the area (U.S. Bureau of Land Management, 1987)

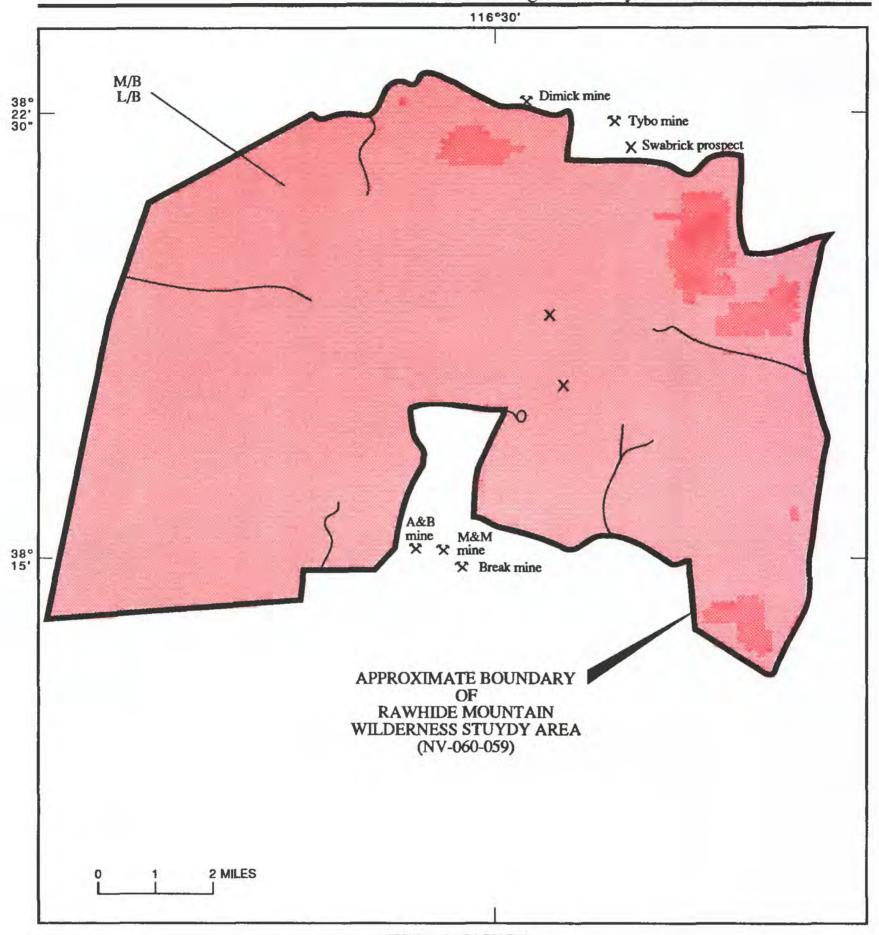
Mineral setting:

The central part of the area is underlain by Paleozoic sedimentary rocks (mainly carbonates) that are overlain and faulted against Tertiary volcanic rocks on both the east and west sides of the area. The volcanic rocks are dominantly comprised of silicic ash-flow tuffs but also include andesitic rocks and silicic dikes. The westernmost parts of the area are covered by Quaternary alluvium.

Recommendations: Additional geologic mapping and geochemical sampling are required to determine if mineralization in the Tybo district extends into the area. This Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey. A mineral study is particularly important because of the lack of specific information about prospects and mineralized structures known to be in the Rawhide area.

References:

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- Kleinhampl, F.J., and Ziony, J.I., 1984, Mineral resources of northern Nye County, Nevada: Nevada Bureau of Mines and Geology Bulletin 99B, 243 p.
- Kleinhampl, F.J., and Ziony, J.I., 1985, Geology of northern Nye County, Nevada: Nevada Bureau of Mines and Geology Bulletin 99A, 172 p.
- Kral, V.E., 1951, Mineral resources of Nye County, Nevada: University of Nevada Bulletin, v. 45, no. 3, 223 p.
- Quinlivan, W. D., and Rogers, C. L., 1974, Geologic map of the Tybo quadrangle, Nye County, Nevada: U.S. Geological Survey Miscellaneous Investigations Map I-821, scale 1:48,000.
- U.S. Bureau of Land Management, 1987, Final Environmental Impact Statement, wilderness recommendations for the Tonopah Resource Area, Nevada, 333 p.



EXPLANATION

- M/B Geologic terrane having moderate mineral resource potential for silver, lead, and zinc with certainty level B
- L/B Geologic terrane having low mineral resource potential for geothermal energy, oil and gas, and sand and gravel with certainty level B

Mineral resources of the Rawhide Mountain Wilderness Study Area.

Area number: Size (acres):

Red Spring NV-010-091 7,847

Status of

mineral surveys:

This area was not studied by the U.S. Bureau of Mines or the U.S.

Geological Survey.

Identified mineral resources (known):

No mineral resources have been identified within the Wilderness Study

Area.

Mineral resource potential The area has high resource potential for oil and gas (Sandberg, 1982;

1983).

(undiscovered):

Mining activity:

There are no known active mines within the WSA. July 1989 BLM records show 15 active claims within or adjacent to the southwest corner

of the WSA.

Mineral setting:

Most of the area is covered by late Cenozoic sedimentary strata. These weakly consolidated sediments accumulated in fresh water basins and contain a large proportion of volcanic ash. The Cenozoic rocks overlie

Permian and Pennsylvanian conglomerates and pebbly limestones.

Recommendations: Seismic studies should be make to determine the thickness the Cenozoic strata and the configuration of the pre-Cenozic structural surface. Drilling will be necessary to discover petroleum if a sedimentary or structural target is defined. This Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the

U.S. Geological Survey.

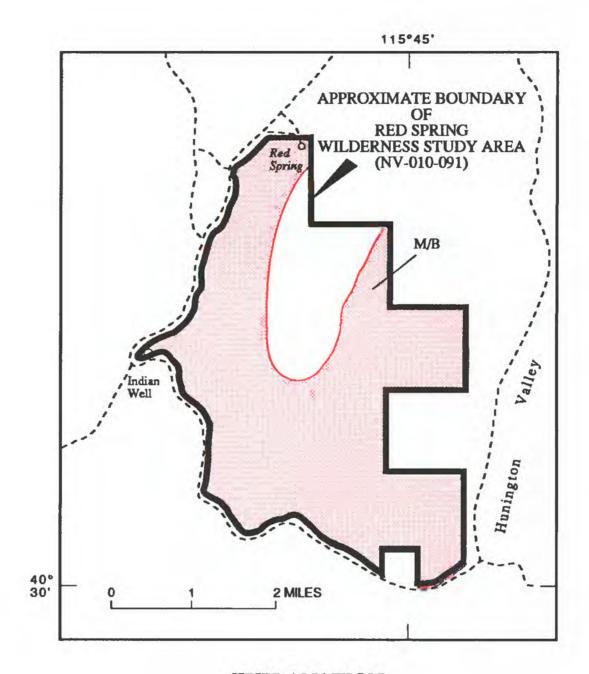
References:

Matthews, G. W. and Blackburn, W. H., 1983, Cedar Ridge Gem Resource Area (NV-010-05), Elko County, Nevada: TERRADATA, (BLM Contract No. YA-553-CT2-1042).

Nevada Mining Association, 1988, Nevada BLM Wilderness Study Areas, Mineral Potential Handbook: unpublished report.

Sandberg, C.A., 1982, Petroleum potential of wilderness lands, Nevada: U.S. Geological Survey Miscellaneous Investigations Series Map I-1542.

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EXPLANATION

H/B Geologic terrane having high mineral resource potential for oil and gas with certainity level B

M/B Geologic terrane having moderate mineral resource potential for oil and gas with certainty level B

Mineral resources of the Red Spring Wilderness Study Area.

Resting Springs Range

Area number:

NV-050-460

Size (acres):

3,850



mineral surveys:

This area was not studied by the U.S. Geological Survey or the U.S.

Bureau of Mines.

Identified mineral resources (known):

No mineral resources have been identified within the Wilderness Study Area. Zeolite (clinoptilolite), borates, strontium, nitrates, lithium, clay, silica, carbonates, pumicite, stone, gold, silver, copper, lead, zinc,

uranium, and geothermal energy occur nearby.

Mineral resource potential (undiscovered):

Due to the location and occurance of similar rock types as those of the Walker Lane mineral belt, the potential for antimony, copper, fluorspar, gold, silver, iron, tungsten, lead, zinc, and mercury is low. The presence of several hot springs in the area makes the potential for geothermal resources moderate, and there is no potential for petroleum. There is high potential for bentonite clay, and low potential for zeolites, borates, strontium, nitrates, lithium, silica, limestone, pumice, stone, and

uranium.

Mining activity:

Zeolites have been mined at Ash Meadows, a few miles north of the

study area.

No mining claim locations were active in the study area in July 1989 (BLM records), nor were there any mines or prospects. There were no oil and gas leases in 1983 (Great Basin GEM Joint Venture, 1983).

Mineral setting:

Quartzite, conglomerate, siltstone, limestone and dolomite of Precambrian age are downthrown by two N/NE trending faults which form a small graben structure. The area is located to the south west of the southern end of the Virginia City Tonopah mineral belt (Walker Lane). The northwest portion consists of Tertiary sediments intercalated with minor amounts of volcanic tuff and abundant clays. Cinder cones and some hot springs have been identified in the area. To the east, the Precambrian unit is overlain by Quaternary alluvial deposits of beach

sand and dune fields.

Recommendations:

This Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological

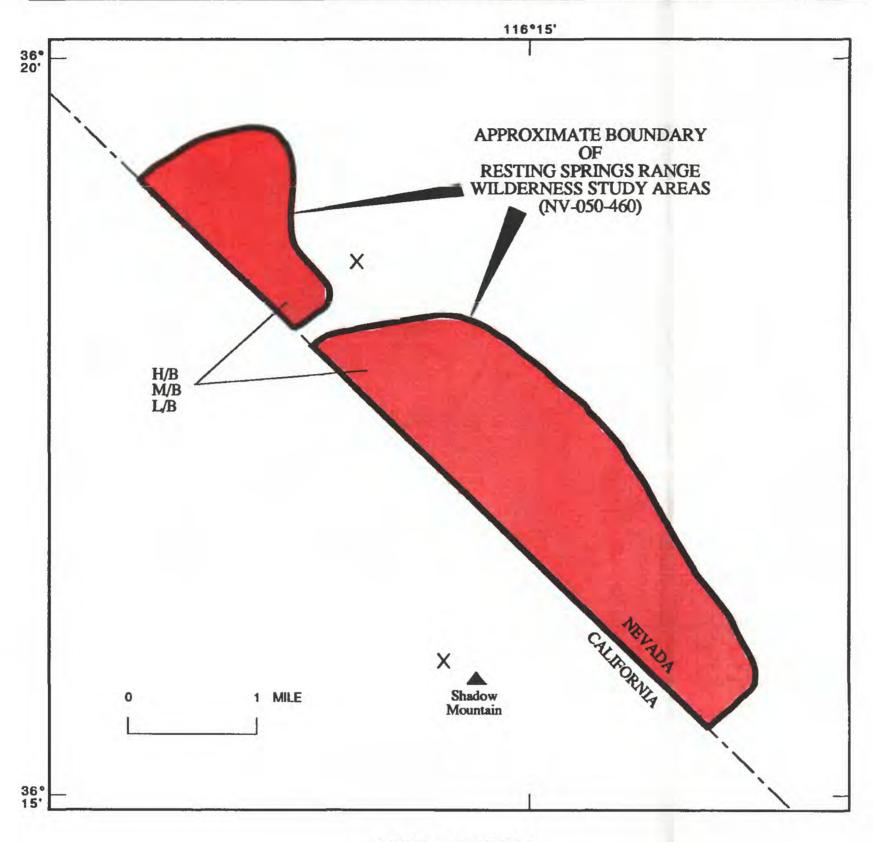
Survey.

References:

Berridge, W.C., 1982, National Uranium Resource Evaluation, Death Valley Quadrangle, California and Nevada: Grand Junction, Colorado, Bendix Field Engineering Corporation, for U.S. Department of Energy, Open-File report PGJ/F-083(82), 50 p. and

appendixes.

- Burchfiel, B.C., Hamill, G.S., IV, and Wilhelms, D.E., 1983, Structural geology of the Montgomery Mountains and the northern half of the Nopah and Resting Spring Ranges, Nevada and California: Geological Society of America Bulletin 94, No. 11, p. 1359-1376.
- Cook, J.R., 1979, Death Valley 1° x 2° NTMS area, California and Nevada, data report, National Uranium Resource Evaluation Program, hydrogeochemical and stream sediment reconnaissance: Aiken, SC, E.I. du Pont de Nemours & Co, Savannah River Laboratory, for U.S. Department of Energy, Open-File Report GJBX 135(80), 42 p., appendixes A, B, C.
- Cook, J.R., and Fay, W.M., 1982, Data report: western United States, National Uranium Resource Evaluation Program, hydrogeochemical and stream sediment reconnaissance: Aiken, SC, E.I. du Pont de Nemours and Company, Savannah River Laboratory, for U.S. Department of Energy, Open-File Report GJBX 132(82), 33 p.
- Denny, C.S., and Drewes, H., 1965, Geology of the Ash Meadows Quadrangle, Nevada-California: U.S. Geological Survey Bulletin 1181-1, 56 p.
- Geo-Life, Aerial radiometric and magnetic survey, Death Valley National Topographic Map, Nevada, California: Grand Junction, CO, U.S. Department of Energy Open-File Report GJBX-164(79), 39 p. and appendixes.
- Great Basin GEM Joint Ventures, 1983, Resting Spring Range G-E-M Resources Area (GRA NO. NV-30) Technical Report (WSA NV 050-0460): Prepared for the U.S. Bureau of Land Management, 28 p.
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- Sheppard, R.A., and Gude, A.J., 3rd, 1968, Distribution and genesis of authigenic silicate minerals in tuffs of Pleistocene Lake Tecopa, Inyo County, California: U.S. Geological Survey Professional Paper 597, 38 p.



EXPLANATION

- H/B Geologic terrane having high mineral resource potential for clay with certainty level B
- M/B Geologic terrrane having moderate mineral resource potential for geothermal energy with certainty level B
- L/B Geologic terrane having low mineral resource potential for antimony, copper, lead, zinc, zeolites, borates, strontium, nitrates, lithium, silica, limestone, pumice, stone uranium, fluorspar, gold, silver, iron, tungsten, and mercury with certainty level B

Mineral resources of the Resting Springs Range Wilderness Study Area.

Riordan's Well Area number: NV-040-166

Size (acres):

57,002 of which 37,542 were studied at the request of the U.S. Bureau of

Land Management.

Status of

mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of

Mines (Lund and others, 1988).

Identified mineral resources

(known):

No mineral resources have been identified in the Wilderness Study Area.

Extensive areas of limestone and sand and gravel occur within the WSA but, distance to market combined with the abundance of these commodities in the region prevent these materials from being classified as

identified resources.

Mineral resource potential (undiscovered): The Riordan's Well Wilderness Study Area has high resource potential for oil and gas, although specific traps have not been identified. Almost half the area has been leased for oil and gas.

Moderate mineral resource potential is designated for three types of metal occurrences in two parts of the study area. The western part of the study area has moderate potential for tungsten and polymetallic base-metal (copper, lead, zinc, molybdenum, and bismuth) deposits in hydrothermal replacement deposits in low-grade metamorphic rocks and for gold and silver in quartz veins associated with the replacement mineralization. The southeastern and eastern parts of the study area have moderate potential for gold in disseminated deposits associated with jasperoid occurrences.

The remainder of the area has low resource potential for other metals, nonmetals (magnesite, high-purity limestone or dolostone, sand and gravel), or other energy resources (geothermal energy, uranium, and coal).

Mining activity:

There is no production from the WSA. However, there are 296 claims according to July 1989 BLM records. These include claim blocks by Westmont Mining Incorporated, Inspiration Development Company, Icarus Exploration, Ronald Willden (Permian Exploration Co.), and Phelps Dodge Corporation; probably mostly for gold and silver.

Mineral setting:

The Grant Range is an east-tilted fault block. The faulting exposed a stratigraphic section, from west to east, of thick carbonate sedimentary rocks of the Paleozoic (see geologic time scale) continental shelf that are overalin by Tertiary basin deposits and by a sequence of Tertiary volcanic and basin-fill deposits. The oldest exposed Paleozoic rocks are metamorphosed. Rocks of the Grant Range show a complex structural history developed during Mesozoic compressional and Tertiary extensional events.

Recommendations: As only part of this area has been studied as part of a mineral survey by

the U.S. Geological Survey and the U.S. Bureau of Mines, further work

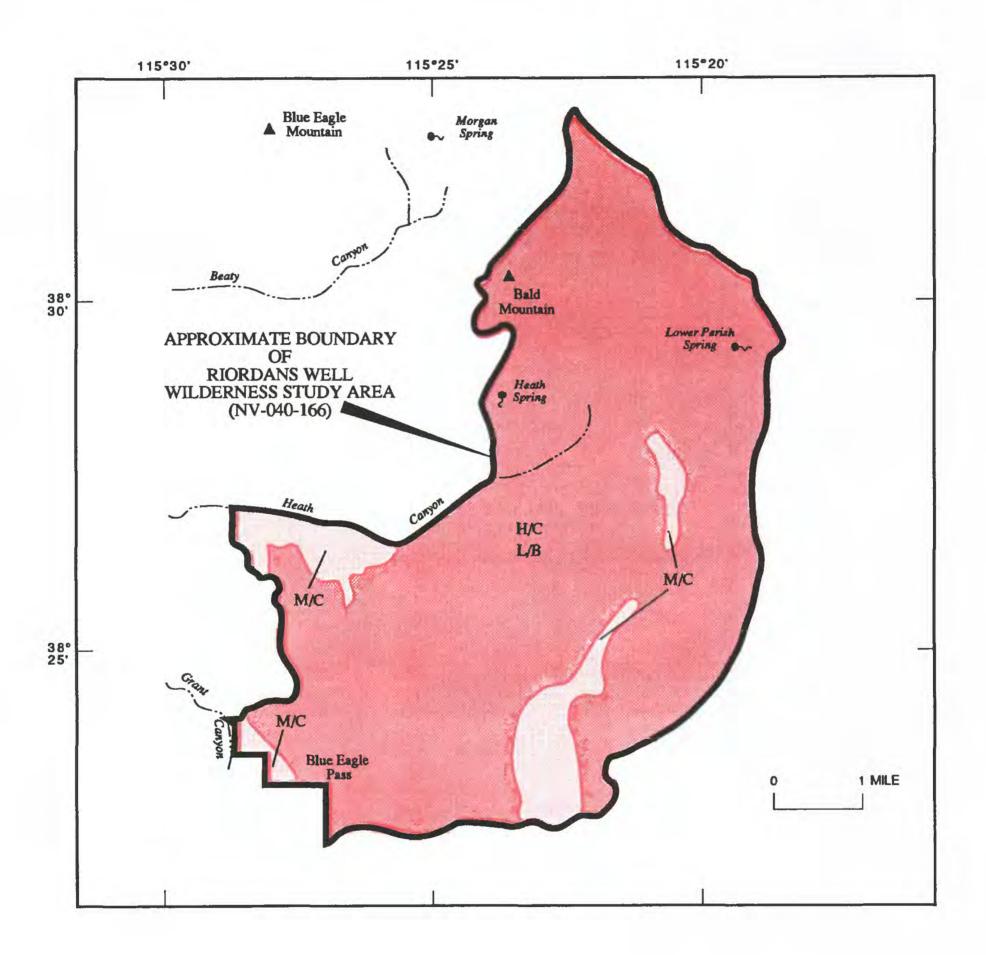
is needed to assess the 19,460 acres that constitute the balance.

References:

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Mineral resources of the Riordan's Well Wilderness Study Area.

EXPLANATION

Geologic terrane having high energy resource potential for petroleum, at certainty level C—Applies to entire study area
Geologic terrane having high energy resource potential for petroleum at certainty level C and moderate mineral resource potential for commodities as indicated below, at certainty level C
Gold
Gold and silver; tungsten; copper, lead, zinc, molybdenum, and bismuth
Geologic terrane having low resource potential for other metals, nonmetals, coal, and geothermal energy, with certainty level B—Applies to entire wilderness study area
Levels of certainty
Available information suggest level of resource potential
Available information gives good indication of level of resource potential

Area number: Size (acres):

Roberts NV-060-541 15,090



Status of mineral surveys:

This wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (McKee and others, 1986).

Identified mineral resources (known):

No mineral resources have been identified in the Wilderness Study Area. The one known deposit, the Kelley mine, is too small and low grade to be mined in the foreseeable future (Benjamin and Johnson, 1986). The deposit was too poorly known to allow estimation of resources.

Mineral resource potential (undiscovered):

Stream-sediment samples from the Kelley Creek drainage contain anomalous amounts of silver, lead, and zinc; the area including this drainage has low mineral resource potential for these metals in hydrothermal veins that follow faults and shear zones in carbonate host rock. Some rock samples from outcrops along the east edge of the study area contain anomalous amounts of gold and silver, as well as a suite of volatile elements including arsenic, antimony, and mercury that locally are indicators of precious-metal mineralization. These samples are associated with silicified zones that formed in dolomitic rock beneath the Roberts Mountains thrust fault. These zones have high, moderate, and low resource potential for gold and silver. Two similar areas of silicified and altered dolomite in the southwest part of the study area have moderate-to-low resource potential for gold and silver. An east-west trending zone in the central part of the study area and two areas near its western edge contain anomalous amounts of gold and silver in altered dolomite and limestone associated with major faults and shear zones. These areas have moderate-to-low potential for gold and silver resources. Because of widespread heating by igneous activity in the area, there is little to no likelihood of oil and gas resources.

Mining activity:

The Kelley mine is located in Kelley Canyon, in the northern portion of the study area. In 1937, it produced 47 tons of ore containing 0.8 oz/ton silver, 9.6 percent lead, and 39.8 percent zinc. Prior to this, in the early 1900s, it had produced 350 tons of ore of unknown content. The Kelley mine is within the Antelope mining district, which has produced about \$200,000 in lead, silver, copper, and barite.

In the early 1980s, 10,000 tons of barite was mined from the Bat and Bar claims, east of the study area, and several hundred tons was produced from the Firecracker claims, southwest of the study area. Decreased demand for barite has put these properties out of production.

The Blue Eagle mine is on the western flank of the Roberts Mountains, in the Antelope mining district. At the shaft there is a small stockpile of ore which contains 39 percent antimony (Lawrence, 1963).

The Mount Hope mining district, which lies to the southeast of the WSA, has produced more than \$1 million worth of zinc and cadmium. The Antelope mining district, which includes the western portion of the WSA, has produced about \$200,000 in lead, silver, copper, and barite.

There are large blocks of mining claims, consisting of several thousand claims, in and around the WSA on the west, south, and east. There are about 200 claims within the WSA (BLM records, July 1989).

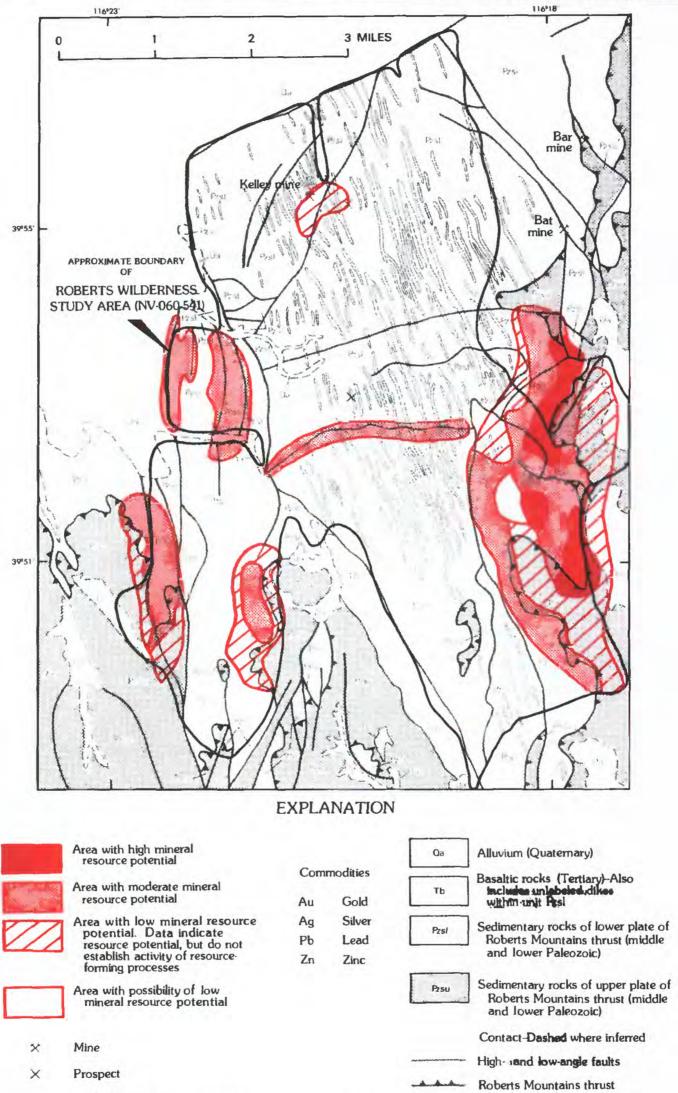
Mineral setting:

The study area is underlain by a folded and faulted sequence of marine sedimentary rocks of Cambrian through Devonian age (about 570 to 360 million years ago) capped in places by Tertiary (about 65 to 2 million years age) lava and ash flows and intruded by many Tertiary basalt dikes. Most of the Cambrian through Devonian rocks int he study area are limestone and dolomite. The Roberts Mountains thrust, and important regional structural feature, is present in the southeast part of the wilderness study area.

Recommendations: No further studies are recommended.

References:

- Benjamin, D.A., and Johnson, F.L., 1986, Mineral resources of the Roberts Wilderness Study Area, Eureka County, Nevada: U. S. Bureau of Mines open-file report MLA 24-86, 27 p.
- Great Basin GEM Joint Venture, 1983, Robert G-E-M Resources Area (GRA No. NV-08) technical report (WSA NV 060-451): Prepared for the BLM under contract YA-553-RFP2-1054 for the BLM, 33 p.
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- Lawrence, E.F., 1963, Antimony deposits of Nevada: Nevada Bureau of Mines and Geology Bulletin 61, 248 p.
- McKee, E.H., Barton, H.N., Ponce, D.A., Benjamin, D.A., and Johnson, F.L., 1986, Mineral resources of the Roberts Wilderness Study Area, Eureka County, Nevada: U. S. Geological Survey Bulletin 1731-K, 10 p.
- Papke, K.G., 1984, Barite in Nevada: Nevada Bureau of Mines and Geology Bulletin 98, 125 p.



Mineral resources of the Roberts Wilderness Study Area.

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Name:

Area number: Size (acres): Rough Hills NV-010-151

6,685

Status of

mineral surveys:

This wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Wallace and others 1087)

and others, 1987).

Identified mineral resources (known):

Placer gold has been identified in the study area at the Perry Prospect, near the confluence of Copper Creek and the Bruneau River. The gold occurs in bedrock fractures and sandy gravels overlying the bedrock. Gold value varies from less than \$0.10 per cubic yard to more than \$9.00 per cubic yard (gold price of \$325 per troy ounce). The average gold value is less than \$1.00 per cubic yard. About 3,000 cubic yards of gravel occur.

Mineral resource potential (undiscovered):

The wilderness study area has a low mineral resource potential for undiscovered metasomatic gold, silver, tungsten, molydbenum, and copper, disseminated gold and silver, placer gold, barite, tin, sand and gravel, uranium and thorium, and oil and gas.

Mining activity:

Three mining districts are adjacent to or within five miles of the WSA. The Charleston district is about one mile east of the WSA, the Island Mountain district is about one mile west, and the Alder district is about five miles northwest. These districts have produced gold, silver, copper, lead, zinc, tungsten, and antimony, mostly from veins. Renewed interest in these districts has been spurred by current metal prices.

Mineral setting:

Most of the Rough Hills Wilderness Study Area is underlain by the Jarbidge Rhyolite, a volcanic rock that was erupted approximately 15 m.y. ago (million years ago; see geologic time chart). Mesozoic sedimentary rocks and older Tertiary volcanic rocks underlie the Jarbidge Rhyolite, and upper Tertiray sedimentary rocks overlie the rhyolite. All of the rocks in the area are faulted to some degree.

Recommendations: No further work is recommended.

References:

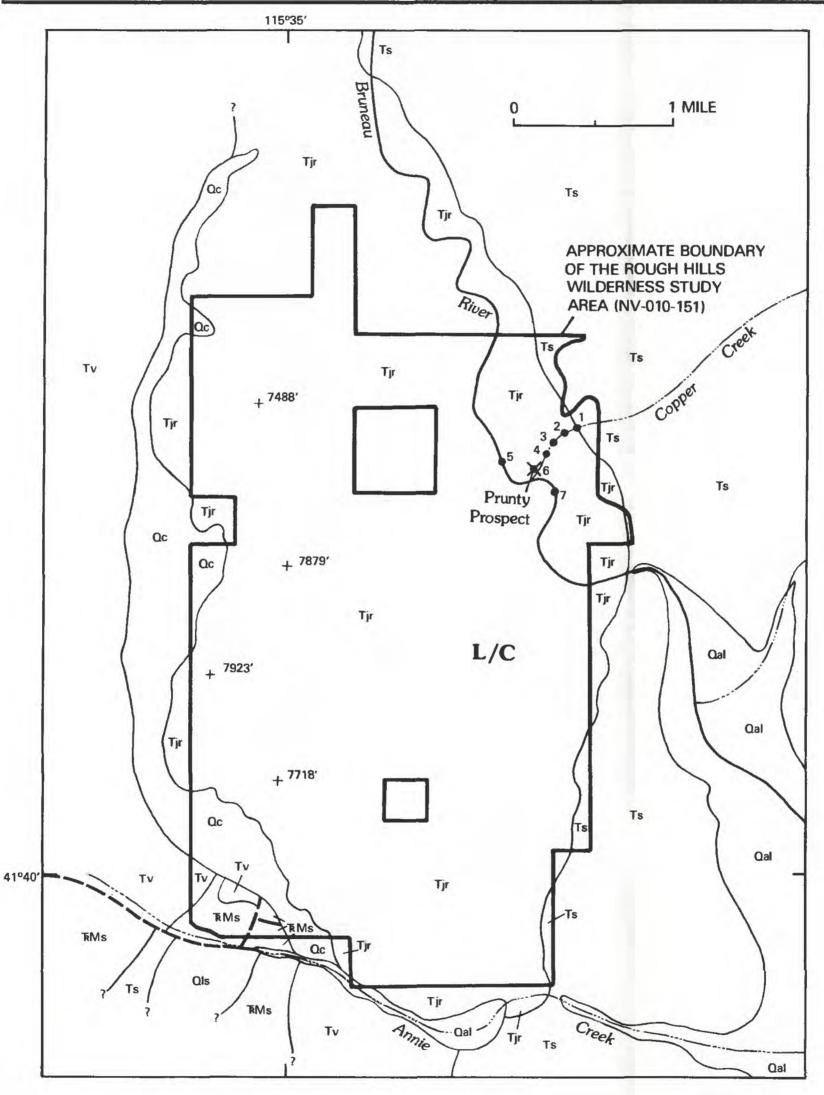
Coash, J.R., 1967, Geology of the Mount Velma Quadrangle, Elko County, Nevada: Nevada Bureau of Mines Bulletin 68, 20 p.

Granger, A.E., Bell, M.M., Simmons, G.C., and Lee, Florence, 1957, Geology and mineral resources of Elko County, Nevada: Nevada Bureau of Mines Bulletin 54, 190 p.

Hope, R.A., and Coats, R.R., 1976, Preliminary geologic map of Elko County, Nevada: U.S. Geological Survey Open-File Map OF 76-779, scale 1:100,000, six sheets.

Lawrence, E.F., 1963, Antimony deposits of Nevada: Nevada Bureau of Mines Bulletin 61, 248 p.

- Mathews, G.W., and Blackburn, W.H., 1983, Assessment of geology energy and mineral (GEM) resources, Rough Hills GEM Resource Area, (NV-010-03), Elko County, Nevada: Lakewood, Colorado, TERRADATA, U.S. Bureau of Land Management contract YA-553-CT2-1042 Open-File Report, 52 p.
- Quade, J., and Tingley, J.V., 1984, Reconnaissance geochemical assessment of mineral resources in Rough Hills WSA (NV-010-151) Elko County, Nevada: Nevada Bureau of Mines and Geology for U.S. Bureau of Land Management contract YA-553-CT1-1058 Open-File Report, 15 p.
- Smith, R.M., 1976, Mineral resources of Elko County, Nevada: U.S. Geological Survey Open-File Report 76-56, 194 p.
- Wallace, A.R., Turner, R.J., Grauch, V.J.S., and Plesha, J.L., 1987, Mineral resources of the Rough Hills Wilderness Study Area, Elko County, Nevada: U.S. Geological Survey Bulletin 1725-D, 10 p.

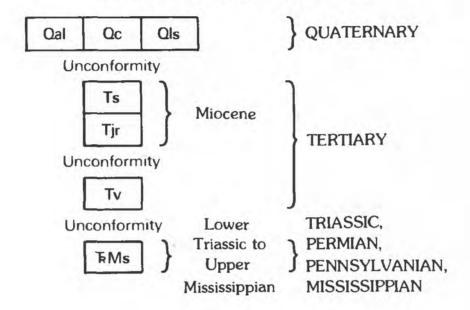


Mineral resources of the Rough Hills Wilderness Study Area.

EXPLANATION

L/C Geologic terrane having low mineral resource potential for disseminated gold and silver; placer gold; contact metasomatic gold, silver, copper, tungsten, and molybdenum; barite; tin; sand and gravel; uranium and thorium, and oil and gas—Applies to entire study area

CORRELATION OF MAP UNITS



LIST OF MAP UNITS

Alluvium (Quaternary)

- Oc Colluvium (Quaternary)

 Ols Landslide deposits (Quaternary)

 Ts Sedimentary rocks, undivided (Tertiary)

 Tjr Jarbidge Rhyolite (Miocene)

 Tv Volcanic rocks, undivided (Tertiary)

 RMs Sedimentary rocks, undivided (Lower Triassic through Mississippian)
- Contact—Queried where uncertain
 Fault, approximately located
 USBM sample locality

Explanation, mineral resources of the Rough Hills Wilderness Study Area.

Qal

Selenite Mountain

Area number:

NV-020-200

Size (acres):

32,041

Status of

This area was not studied by the U.S. Bureau of Mines or the U.S.

mineral surveys: Geological Survey.

Identified mineral resources (known):

No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential

(undiscovered):

Resource potential for epithermal type gold and (or) silver deposits is low in the entire area. There is moderate potential for geothermal energy resources in the extreme northern part of the area and low potential in the rest of the area. No evidence is available that indicates the presence of

any resource potential for oil or gas in this area.

Mining activity:

July 1989 BLM records show no active mining claims in the study area. The Hooker mining district, about one mile south of the WSA, has had

production of gypsum and tungsten.

Mineral setting:

The area is underlain by metamorphiosed volcanic rocks of Late Permian age that have been intruded by Cretaceous granodiorite. Locally these rocks are capped by younger volcanic and sedimentary rocks.

Recommendations: Detailed geologic mapping, geochemical sampling, and geophysical studies would identify alteration areas which, if present would raise the potential for precious metal deposits. The Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey.

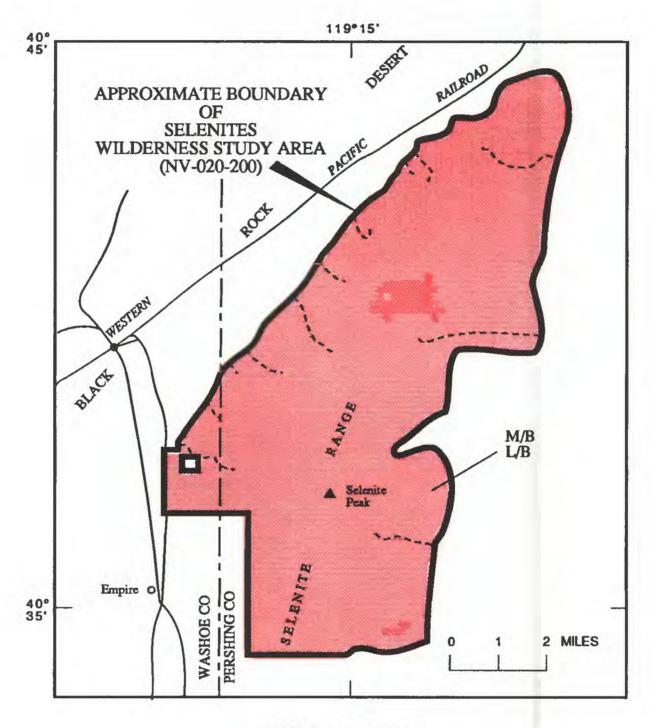
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- Muffler, L.J.P., ed., 1978, Assessment of geothermal resources of the United States-1978: U.S. Geological Survey Circular 790, 163 p.
- Sandberg, C.A., 1983, Petroleum potential of wilderness lands in Nevada, in Miller, B.M., ed., Petroleum potential of wilderness lands in the western United States: U.S. Geological Circular 902-A-P, p. H1-H11.



EXPLANATION

M/B Geologic terrane having moderate mineral resource potential for geothermal energy with certainty level B

L/B Geologic terrane having low mineral resource potential for gold, silver, and geothermal energy with certainty level B

Mineral resources of the Selenite Mountain Wilderness Study Area.

Sheldon Contiguous

Area number:

CA-020-1012

Size (acres):

23,700 of which 780 were studied at the request of the U.S. Bureau of

Land Management.

Status of

mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey

and the U.S. Bureau of Mines (Bergquist and others, 1988).

Identified mineral resources (known):

There are no identified mineral resources in the wilderness study area.

Mineral resource potential

(undiscovered):

There is low potential for undiscovered natural gas resources and low potential for mercury, gold, and silver resources beneath the basalt.

Mining activity:

There has been no known prospecting activity or mineral production from the wilderness study area. The wilderness study area is not part of any organized mining district; there are no current mining claims in the wilderness study area according to October, 1988, U.S. Bureau of Land Management records.

Mineral setting:

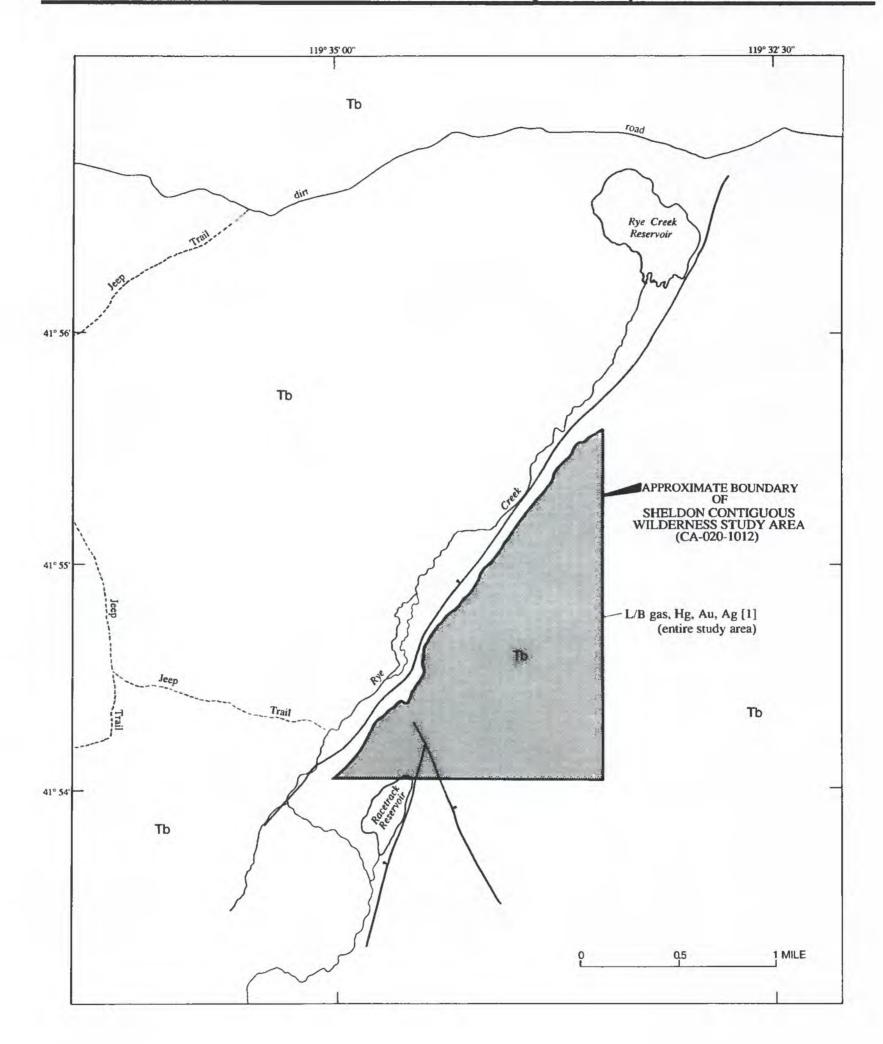
The study area is in a transitional region between the Basin and Range and the Columbia Plateau physiographic provinces and is covered by Cenozoic (see geologic time chart) volcanic rocks. The surrounding area is broken by sets of predominantly northwest-trending high-angle normal faults that have shaped the terrain into flat-topped, tilted fault blocks bounded by steep fault scarps. The entire study area is underlain by basalt of Miocene age which weathers to a dark-gray or black color and forms a bouldery surface.

Recommendations: As 22,920 acres (97 percent) were not requested for mineral surveys by the U.S. Bureau of Land Management, this unstudied part of the wilderness study area should be studied as part of a comprehensive mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines.

References:

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Mineral resources of the Sheldon Contiguous Wilderness Study Area.

EXPLATION



Area having low mineral resource potential (L); data only suggest certainty of assessment (B)

COMMODITIES

Ag	Silver
Au	Gold
Hg	Mercury
	Gas

[] TYPE OF DEPOSIT OR OCCURANCE

1 Hot spring mercury, gold, and silver

DESCRIPTION OF MAP UNIT

Basalt of Catnip Creek of Greene (1984) (Miocene)—
Brownish black- to black-weathering basalt flows dark to medium grey on fresh surfaces; individual flows typically 10 to 20 ft thick; locally vesicular to scoriaceous

——— Fault—Dashed where approximately located. Bar and ball on downthrown side

Silver Peak Range

Area number:

NV-060-338

Size (acres):

33,900 of which 17,850 were studied at the request of the U.S. Bureau of

Land Management.

Status of

mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of

Mines (Keith and others, 1988).

Identified mineral resources (known):

No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential (undiscovered): Two parts of the study area have high and moderate resource potential and the remainder has low resource potential for gold and silver in epithermal veins. The entire study area has low resource potential for gold and silver in epithermal disseminated deposits and geothermal energy. One small area in Icehouse Canyon has low resource potential

for cement-grade marble.

There is low potential for oil and (or) gas resources and also for uranium

and thorium resources in the entire study area.

Mining activity:

The Silver Peak mining district is on the east side of the study area and the Dyer mining district is on the west. Sunshine Mining Company's Sixteen-to-One mine is located 3 miles to the east. Approximately 2000 active claims are located within or adjacent to the study area. Mineralization within and near the WSA consists mainly of epithermal quartz veins which occur along fractures in volcanic and calcareous sedimentary rocks. Veins contain anomalous amounts of arsenic, lead, zinc, copper, and barium at the surface.

Mineral setting:

The predominant rock types in the study area are volcanic flows and pyroclastic rocks of Tertiary age (1.7 to 66 million years before present, or Ma) (see geologic time chart) that overlie sedimentary rocks of Paleozoic age and plutonic rocks of Jurassic age. The study area is bordered on the northwest by a broad alkali flat that is part of Fish Lake Valley and on the east by the west margin of the Silver Peak caldera.

Recommendations:

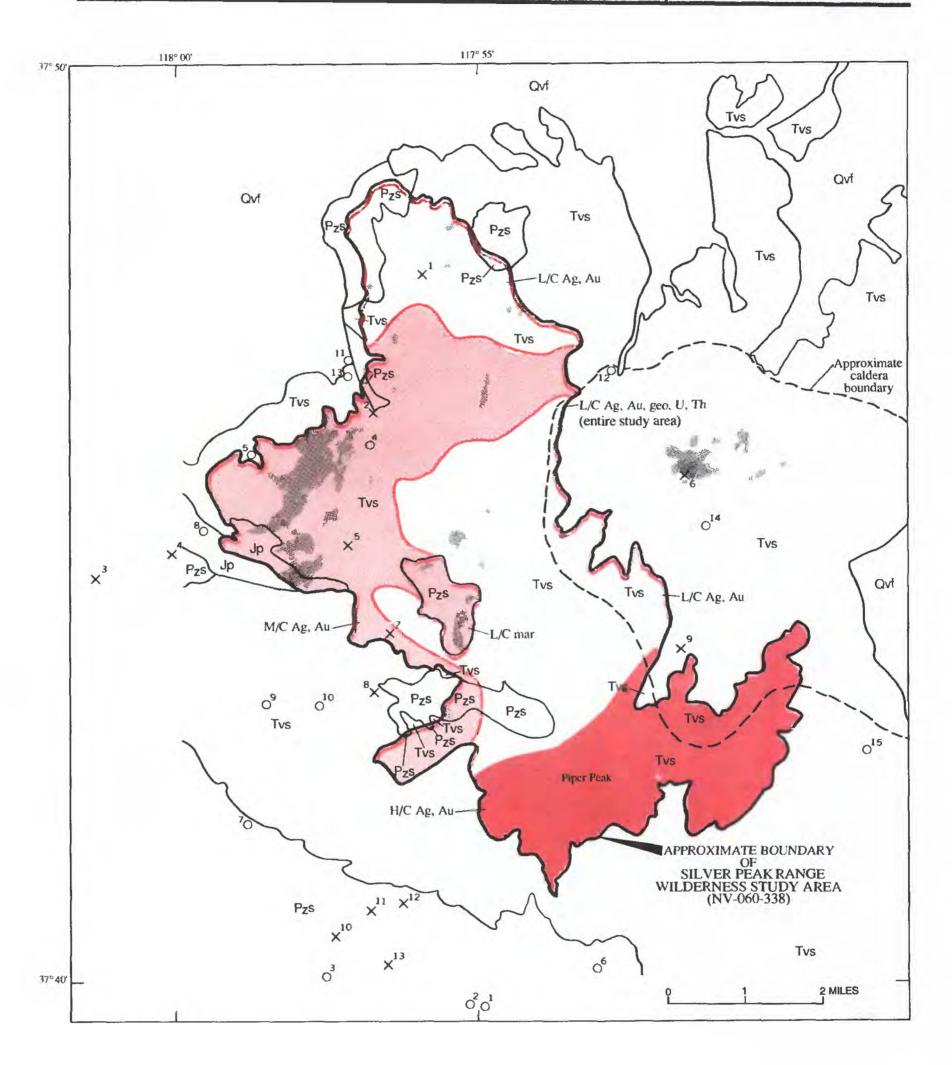
As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 16,050 acres that constitute the balance. Additional mapping and sampling are needed within the area previously

studied to further define potential resources.

References:

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- Close, T.J., 1986, Mineral resources of the Silver Peak North study area, Esmeralda County, Nevada: U.S. Bureau of Mines Mineral Land Assessment Open-File Report MLA 17-87, 17 p.
- Earnest, D.F., 1984, Geology of the Sixteen-to-One mine, Esmeralda Conty, Nevada: an unpublished Sunshine Mining Company report, 6 p.
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- Nevada Mining Association, 1988, Nevada BLM Wilderness Study Areas, Mineral Potential Handbook: Reno, Nevada, unnumbered pages.
- Robinson, P.T., Stewart, J.H., Moiola, R.J., and Albers, J.P., 1976, Geologic map of the Piper Peak Quadrangle, Esmeralda County, Nevada: U.S. Geological Survey Geologic Quadrangle Map GQ-1325, scale 1:62,500.
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Mineral resources of the Silver Peak Range Wilderness Study Area.

EXPLANATION

Area with high mineral resource potential

Area with moderate mineral resource potential

Area with low mineral, geothermal, and petroleum resource potential

See appendixes for definition of levels of mineral resource potential (H,M,L) and certainty of assessment (C)

Commodities

Ag	Silver
Au	Gold
mar	Marble
geo	Geothermal
Ŭ	Uranium
Th	Thorium

Geologic map units

Qvf	Valley fill (Quaternary)Colluvial and alluvial valley fill deposits
Tvs	Volcanic and sedimentary rocks (Tertiary)
Jp	Plutonic rocks (Jurassic)
Jp P _z s	Metamorphosed sedimentary rocks (Paleozoic)
	Contact
×6	ProspectNumbers refer to table 1

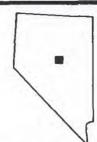
O⁹ Geochemical sample site--Numbers refer to text

Alteration area indicated by remote sensing

Explanation, mineral resources of the Silver Peak Range Wilderness Study Area.

Area number: Size (acres):

Simpson Park NV-060-428 49,670



Status of

mineral surveys:

This area was not studied by the U.S. Bureau of Mines or the U.S. Geological Survey.

Identified mineral resources (known):

No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential (undiscovered): There is low potential for resources of barite in the northern part of the area in the siliceous Ordovician strata. Turquoise might be found in the same type of rocks in the same general area. There is low potential for oil and gas resources.

Mining activity: The Lombardo Turquoise Mining Co., Inc., is currently mining turquoise and variscite from the Ackerman mine, about 1 mile south of the WSA.

Barite is reported to occur in the northern and western portions of the WSA (Papke, 1984; Higgins and others, 1988).

There is a large block of about 100 claims in the Shagnasty Basin area, and another block of about 30 claims in the northernmost portion of the WSA (BLM records, July 1989). Oil and gas leases cover 700 acres of the valley and lower mountain slopes of the WSA.

Mineral setting:

The southern two thirds of the area is comprised of Oligocene andesitic volcanic rocks, mostly lava flows that overlie siliceous sedimentary rocks of Ordovician age. The Ordovician strata are part of the upper plate of the late Paleozoic Roberts Mountains thrust system.

Recommendations: Detailed geochemical sampling of rocks and stream sediments in the northern part of the area checking specifically of Ba, Pb, Zn, Cu, Hg, An, As, and Au. This Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey.

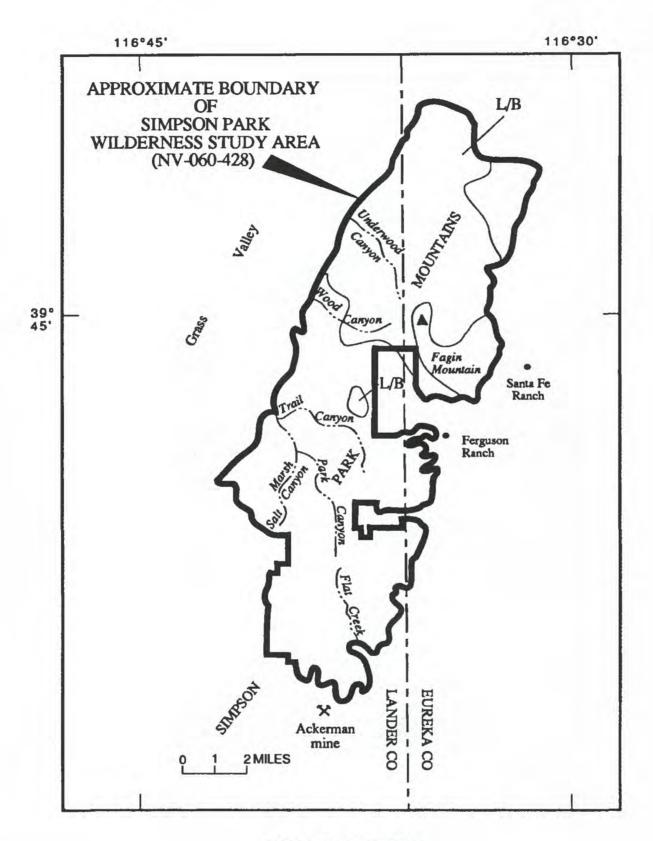
References:

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McKee, E.H., 1968, Geologic map of the Ackerman Canyon Quadrangle, Lander and Eureka Counties, Nevada: U.S. Geological Survey Quadrangle Map GQ-761, scale 1:62,000.

Papke, K.G., 1984, Barite in Nevada: Nevada Bureau of Mines and Geology Bulletin 98, 125 p.

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- Stewart, J.H., McKee, E.H., 1977, Geology and mineral deposits of Lander County, Nevada: Nevada Bureau of Mines and Geology Bulletin 88, 106 p.



EXPLANATION

L/B Geologic terrane having low mineral resource potential for barium, and oil and gas with certainty level B

Mineral resources of the Simpson Park Wilderness Study Area.

Area number:

Skedaddle CA-020-612

Size (acres):

62,011 of which 39,420 were studied at the request of the U.S. Bureau of

Land Management.

Status of mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey

and the U.S. Bureau of Mines (Diggles and others, 1988b).

Identified mineral resources (known):

The identified resources in the Skedaddle Mountain Wilderness Study Area consist of 46,000 tons of measured subeconomic resources and about 138,000 tons of indicated subeconomic resources of perlite. Additional nonmetallic occurrences present in the study area consist of basalt, pozzolan, stone, and sand and gravel. There are no identified resources of these commodities and they are not currently of economic significance. There are no identified resources of metallic minerals in the study area, but metallic mineral occurrences present in and near the study area consist of small amounts of gold and mercury in vein-type deposits. The gold and mercury occurrences and the perlite resources are spatially related to a volcanic center in the Skedaddle Mountains.

Mineral resource potential (undiscovered):

There are six areas of mineral and (or) geothermal energy resource potential in the Skedaddle Mountain Wilderness Study Area. Geologic and geochemical evidence suggests that the study area has potential for the occurrence of silver, gold, mercury, and antimony metallic deposits. The central part of Spencer Basin, upper Thousand Springs Canyon, and the south fork of Wendel Canyon have high mineral resource potential for gold, silver, mercury, and antimony while the area surrounding these locations has moderate mineral resource potential for the same metals. An area in Wendel Canyon has moderate mineral resource potential for perlite, and an adjacent area to the south has low mineral resource potential for the same commodity. The Skedaddle Mountain Wilderness Study Area includes part of the Wendel-Amedee Known Geothermal Resource Area. The southwest corner of the study area has moderate resource potential for geothermal energy and much of the west half of the study area has low potential for geothermal energy.

Mining activity:

The wilderness study area is not in a mining district. There are no current mining claims in the wilderness study area according to October, 1988, U.S. Bureau of Land Management records. By 1906, 45 lode claims were recorded for gold including a few for mercury. At least 276 recorded lode, 6 located but unrecorded lode, and 29 placer claim locations are present in and within about 1 mi of the study area, but none have any recorded production. Approximately 191 of these are in the study area; four of these were actively held in 1985. None of the study area was being explored by private industry in 1985.

Mineral setting:

The rocks in the study area consist mostly of Tertiary basalt, andesite, dacite, and lahar deposits; minor amounts of rhyolite are also present. Surficial deposits consist of colluvium, alluvium, talus, and lacustrine deposits. South of the study area are lakebed features including tufa deposits and strandlines from Pleistocene Lake Lahontan. Andesite flows, commonly including intercalated basalt, are exposed mostly at higher elevations in the study area. Olivine basalt flows, exposed in the eastern part of the area, are composed of fine-grained to glassy matrix and phenocrysts of olivine. Thick lahar deposits are exposed in the western and southern parts of the study area. Lahars are volcanic debris flows containing at least 80 weight percent solids. They consist of volcanic mud-flow breccia occurring as flows filling channels and as crusts on sides of channels. Two dacite flow-dome complexes crop out along and north of the crest of the Skedaddle Mountains. Dacite flows are also present in Thousand Spring Canyon.

The central part of Spencer Basin is underlain by volcanic rocks which probably were andesite, dacite, and lahar deposits, but which have been silicified, propylitized, and potassically altered to an extent that original lithologies were unrecognizable. Gold mineralization may have been extensive in these altered rocks.

Recommendations:

As only 43 percent of the Skedaddle Mountain Wilderness Study Area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the remaining 22,591 acres. The area also contains three areas which particularly warrant further study; all are in or along the boundary of the study area.

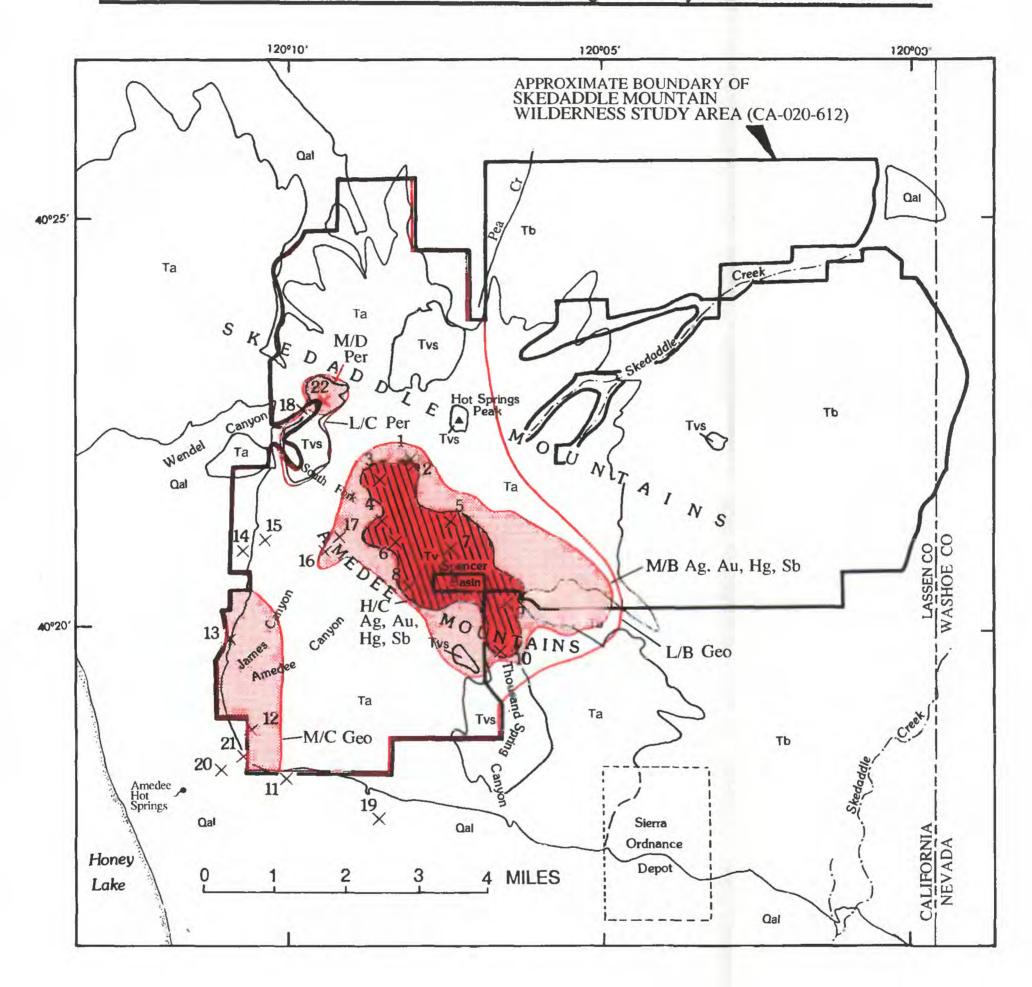
- Perlite is present in a group of rhyolite and rhyolitic units in Wendel Canyon. The perlite occurrence and surrounding area need to be investigated in greater detail in order to determine tonnage and grade with certainty and to look for extensions.
- Near the headwaters of the south fork of Wendel Canyon an area of about 1 mi² contains pervasive argillic alteration, bleaching, extensive limonite staining, quartz veins and veinlets, felsic dikes, some sulfides, geochemical anomalies, and minor amounts of gold. These characteristics are typical of some bulk-tonnage, low-grade, gold and silver deposits. This area should be examined in greater detail for precious metals, especially gold, in either vein (at depth) or bulk-tonnage deposits. Work should include detailed geologic mapping, sampling, induced polarization (IP), magnetometer, and EM16 geophysical surveys, followed by drilling if appropriate.

• A 2 mi-long area of siliceous-sinter outcrops is present near the head of Thousand Spring Canyon, and along the south edge of Spencer Basin. This area contains extensive sinter which has been bleached, contains limonite, and has locally anomalous trace-element concentrations. Additional work is needed to determine the significance, extent, and character of this occurrence as a possible indicator of disseminated gold and silver deposits. Detailed work should include geologic mapping, sampling, geophysical studies (IP, resistivity, EM16, and magnetometer) followed by drilling if appropriate.

References:

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- Diggles, M.F., Dellinger, D.A., and Batatian, L.D., 1989, Geologic map of the Skedaddle Mountain Wilderness Study Area, Lassen County, California, and Washoe County, Nevada: U.S. Geological Survey Miscellaneous Field Studies Map MF-2006, scale 1:48,000.
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Mineral resources of the Skedaddle Wilderness Study Area.

EXPLANATION

Area with high mineral resource potential

Area with moderate mineral resource potential

Area with low mineral resource potential

See appendix for definition of levels of mineral resource potential (L, M, H) and certainty of assessment (B, C, D)

Commodities

Ag Silver
Au Gold
Geo Geothermal energy
Hg Mercury
Per Perlite
Sb Antimony

Description of map units

Qal Alluvium (Quaternary)

Tv Volcanic rocks (Tertiary)—Hachured where silicified, or propylitically or potassically altered

Tvs Silicic volcanic rocks (Tertiary)—Consists of dacite and rhyolite

Ta Andesite and lahar deposits (Tertiary)

Tb Basalt (Tertiary)

Contact

Prospect (Red symbol indicates identified resources)—Numbers refer to table 1 in appendix

Slinkard (Dump Canyon) NV-030-531/CA-010-105

Area number: Size (acres):

6,350

Status of

This area was not studied by the U.S. Bureau of Mines or the U.S. mineral surveys:

Geological Survey.

Identified mineral resources (known):

No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential (undiscovered):

The study area has low resource potential for uranium in the basal gravels of the Relief Peak Formation. The area also has low geothermal resource potential for low temperature geothermal systems along the fault-bounded western edge.

Mining activity: The Silver Mountain mining district is about 10 miles west of the study area and is credited with production of about \$300,000.

The Monitor-Mogul mining district, about five miles northwest, has had about \$3,000,000 worth of production, mostly of gold and silver. Nearby, the Leviathan mine produced \$14.5 million worth of sulfur between 1951 and 1962. The sulfur was used for sulfuric-acid leaching at the Yerrington copper mine in Nevada.

Three miles south of the study area is the Silver King mining district, which has two gold-silver mines but unknown production.

July 1989 BLM records show 200 claims active in the WSA. Large, altered rhyolite and andesite flows have been described in the study area and nearby. Many mining claims have been staked on these altered areas.

Mineral setting:

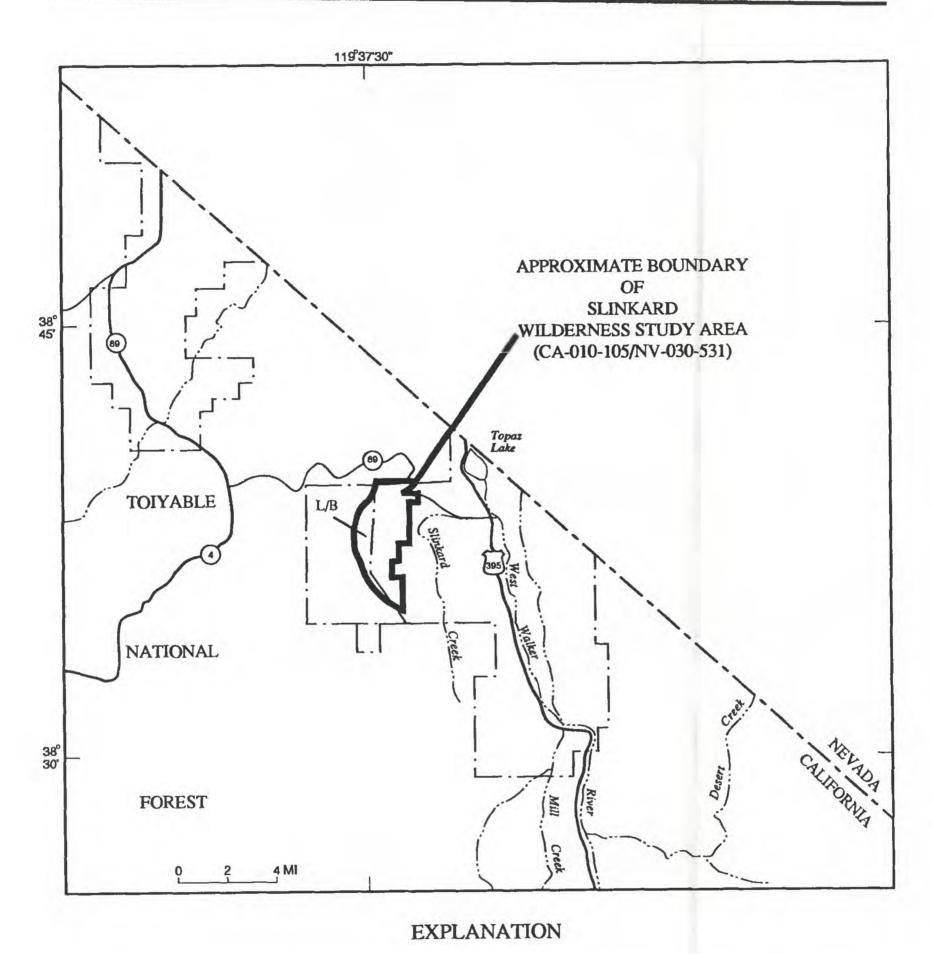
The area is underlain by a layer of interbedded andesitic and basaltic lava flows and mudflows of the Tertiary-age Relief Peak Formation overlying a granitic pluton of Cretaceous age. The western edge of the area is fault bounded.

Recommendations:

Since uranium is known to exist in the basal portion of the Relief Peak Formation, detailed mapping in the unit would indicate weather or not this part of the formation is present and thus clarify the uranium resource potential. Detailed mapping would also locate areas of hydrothermal alteration existing at the surface. This work should be supported by a geochemical study of the area as well. With consideration that three mining districts are within 10 mi of the wilderness study area in similar rock types, a mapped intrusive into sedimentary rocks in the area, and the number of mining claims, the wilderness study area should be studied as part of a comprehensive mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines.

References:

- Clark, W.B., 1970, Gold districts of California: California Division of Mines and Geology Bulletin 193, 186 p.
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- _____1989, Mineral Industry Location System (MILS).



L/B Geologic terrane having low mineral resource potential for uranium and geothermal energy with certainty level B

Mineral resources of the Slinkard Wilderness Study Area.

South Egan Range

Area number: Size (acres):

NV-040-168

96,916

Status of mineral surveys:

This area was not studied by the U.S. Bureau of Mines or the U.S.

Geological Survey.

Identified mineral resources (known):

No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential (undiscovered):

The rocks and geologic setting of the Egan Range proposed wilderness area are similar to the rocks and geologic setting of the adjacent Far South Egans and nearby Mount Grafton Wilderness Areas. It is reasonable to infer that the resource potential and commodities are likely to be similar as well. Areas in the adjacent Far South Egans Wilderness Area (040-172) have identified resources of perlite and high-silica quartzite. Areas likely to have moderate resource potential for gold, cadmium, molybdenum, lead, and zinc have also been identified. East across Cave Valley, areas in the Mount Grafton Wilderness Area (040-169) have identified resources of zinc in low grade deposits, and areas with a high resource potential for tungsten and copper. The Mount Grafton Wilderness Area also contains areas that have a high resource potential for tungsten, zinc, and copper and a moderate resource potential for tungsten, zinc, silver, gold and fluorite.

Both potential source and reservoir rocks for petroleum are present, indicating moderate potential for oil and gas resources.

Mining activity:

The Ellison/Sawmill Canyon mining district lies along the northern boundary of the WSA. Mining occurred in the 1930's and 1940's; the district has produced 3 troy ounces of gold, 801 troy ounces of silver, 11,427 pounds of copper, 4,325 pounds of lead, and 1,910 pounds of zinc. Copper mineralization in skarn near Sawmill Canyon and gold and silver occurrences along the northwest side of the WSA have been reported (Tingley and Bentz, 1983).

The Geyser Ranch mining district, about 10 miles east-southeast of the WSA, is credited with production of 47 tons of 0.35 percent WO3 (tungsten trioxide). Additional tungsten, and silver and base metals, about \$100,000 worth, have been produced from the Patterson mining district, about 15 miles southeast of the study area.

July 1989 BLM records show 67 claims active in the WSA. Most of the claims are along the northern and northwestern boundaries.

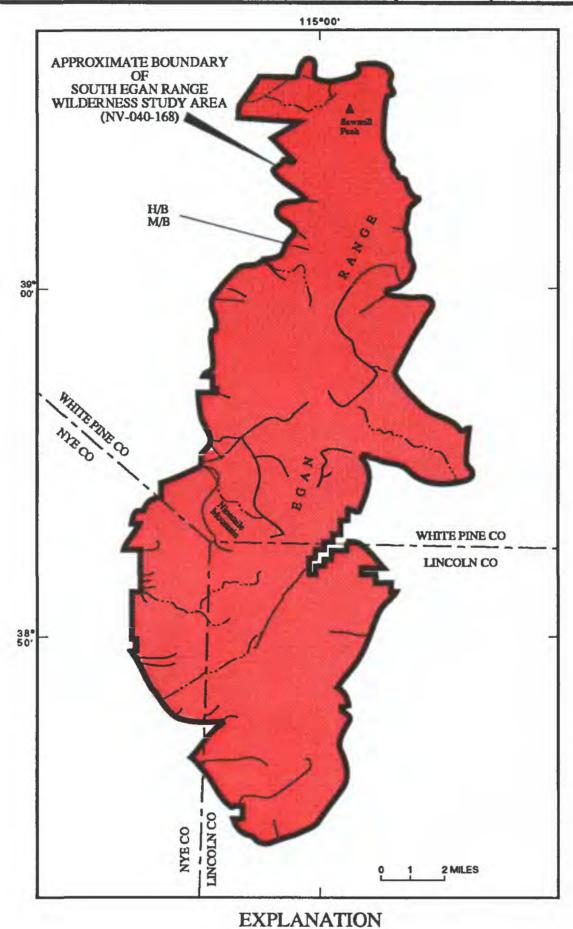
Mineral setting:

The area is part of a steep sided, fault-bounded mountain range typical of the Basin and Range province. A thick sequence of Paleozoic limestone, dolomite, shale, siltstone, sandstone, and quartzite is unconformably overlain by Tertiary volcanic and tuffaceous sedimentary rocks. Some Tertiary volcanic rocks may intrude Paleozoic rocks.

Recommendations: Because significant mineral resources and resource potential have been identified in the closest nearby wilderness areas, this area should be studied as part of a comprehensive mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines.

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- Tschanz, C.M., and Pampeyan, E.H., 1970, Geology and mineral deposits of Lincoln County, Nevada: Nevada Bureau of Mines and geology Bulletin 73, 187 p.
- Van Loenen, R.E., Blank, H.R., Jr., Barton, Harlan, and Chatman, M.L., 1987, Mineral resources of the Mount Grafton Wilderness Study Area, Lincoln and White Pine Counties, Nevada, Chapter F: U.S., Geological Survey Bulletin 1728-F, 24 p.



H/B Geologic terrane having high mineral resource potential for tungsten, copper, and zinc with certainty level B

M/B Geologic terrane having moderate mineral resource potential for gold, silver, lead, zinc, molybdenum, cadmium, fluorite, and oil and gas with certainty level B

Mineral resources of the South Egan Range Wilderness Study Area.

South Fork Owyhee River (Devil's Corrall)

Area number:

NV-010-103A/ID-016-053

Size (acres):

7,842 of which 5,180 were studied at the request of the U.S. Bureau of Land

Management.

Status of

mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Foord

and others, 1987).

Identified mineral resources (known):

Mineral resources include semi-precious gem stones (chalcedony, thunder eggs, and opal), placer gold, sand and gravel, and stone. Both placer gold deposits are small. Sand and gravel occurrences in the area are suitable for aggregate uses but cannot compete with larger deposits closer to potential markets. Stone resources may contain tens of thousands of tons of material but, lack unique properties that would make them preferable to stone deposits more accessible to potential users. Two diatomite deposits and a zeolite deposit occur within five miles of the WSA in geologically similar environments.

Mineral resource potential (undiscovered):

The South Fork Owyhee River Wilderness Study Area has low potential for metals and nonmetals, oil, gas, coal, and geothermal energy.

Mining activity:

No mineral production is known from the Wilderness Study Area, although field evidence indicates production of semi-precious gem stones of less than \$500 value. Even though the area has been prospected for over 50 years, no mining districts and only five prospects occur in or near the WSA. This area was visited by at least 10 exploration companies in 1989 doing reconnaissance exploration for disseminated gold deposits.

July 1989 BLM records show only one claim currently active in the WSA. Oil and gas lease applications cover large portions of the study region, but no resources have been identified (Foord and others, 1987).

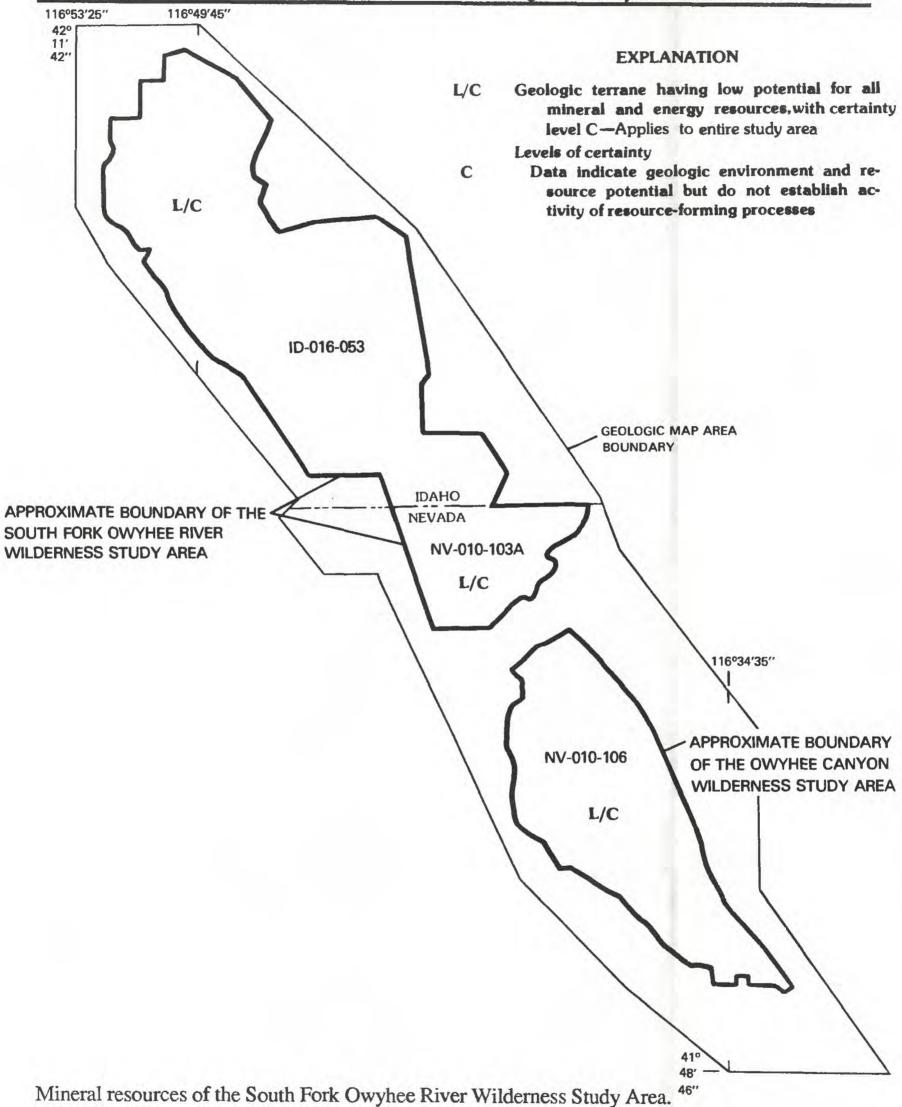
Mineral setting:

The South Fork Owyhee River Wilderness Study Area is located on the Owyhee Upland, and extensive volcanic plateau capped by basaltic lava flows that were erupted intermittently between about 10 and 6 million years ago. These basalts lie on 14 million year old rhyolitic tuff that outcrops in several small areas in the bottom of Owyhee Canyon.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 2,662 acres that constitute the balance. Additional detailed investigations are necessary to determine the source of placer gold, the possible presence of disseminated gold deposits, and if zeolite and diatomite bearing beds exist within the WSA.

References:

- Berry, M.R., Castor, S.B., and Robins, J.W., 1982, National Uranium Resource Evaluation, Jordan Valley Quadrangle, Oregon and Idaho: United States Department of Energy, Open-File Report PGJ/F-132(82), 33 p.
- Ekren, E.B., McIntyre, D.H., Bennett, E.H., and Malde, H.E., 1981, Geologic map of Owyhee County, Idaho, west of longitude 116° west: U.S. Geological Survey Miscellaneous Investigations Map I-1256, scale 1:125,000, 2 sheets.
- Foord, E.E., Luessen, M.J., Hovorka, D.S., Plesha, J.L., Grauch, V.J.S., Barton, Harlan, King, H.D., Capstick, D.O., Mayerle, R.T., Buehler, A.R., and Gabby P.N., 1987, Mineral resources of the Owyhee Canyon and South Fork Owyhee River Wilderness Study Areas, Elko County, Nevada, and Owyhee County, Idaho: U.S. Geological Survey Bulletin 1719-F, 20 p.
- Geodata International, Inc., 1980, Aerial radiometric and magnetic survey, Jordan Valley national topographic map, Oregon and Idaho; United States Department of Energy, Open-File Report GJBX-95(80), 203 p., 108 fiche.
- Hope, R.A., and Coates, R.R., 1976, Preliminary geologic map of Elko county, Nevada: U.S. Geological Survey Open-File Report 76-779, scaale 1:100,000,6 sheets.
- Mathews, G.W., and Blackburn, W.H., 1983, Assessment of Geology, energy, and mineral (GEM) resosurces, Woyhee River GEM Resources Area, (ID-010-11), Owyhee county, Idaho: U.S. Bureau of Land Management contract YA-553-CT2-1042, TERRADATA, Lakewood, CO., 37 p.
- Mayerle, R.T., and Gabby, P.N., 1986, Mineral resources of the South Fork Owyhee River Study Areas, Owyhee County, Idaho, and Elko County, Nevada: U.S. Bureau of Mines Open File Report MLA 5-86, 15 p.
- Oak Ridge Gaseous Diffusion Plant, 1982, Hydrogeochemical and stream sediment reconnaissance basic data for Jordan Valley quadrangle, Oregon and Idaho: United States Department of Energy, Open-File Report GJBX-58(82), 97 p.,1 fiche.
- Weissenborn, A.E., ed., 1964, Mineral and water resources of Idaho; 88 theongress, 2nd Session, Committee on Interior and Insular Affairs, United States Senate, 335 p.



South Jackson Mountains

Area number:

NV-020-603

Size (acres):

60,211 of which 10,300 were studied at the request of the U.S. Bureau of

Land Management.

Status of

mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Sorenson and others, 1987).

Identified mineral resources (known):

No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential (undiscovered):

The results of geologic, geochemical, geophysical, and mineal surveys conducted in 1984 and 1985 delineate one area in the northeastern part of the study area with a moderate potential for undiscovered iron resources in metavolcanic rocks and two areas, in the southeast and northeast corners of the study area, with moderate potential for undiscovered gold, silver, copper, lead, or zinc in metavolcanic rocks. The potential for undiscovered oil and gas and geothermal resources is low.

Mining activity:

The Red Butte mining district is located on the western slope of the Jackson Mountains, about 25 miles northeast of Jungo, Nevada, and includes the southern portion of the South Jackson Mountains. The area has been prospected for gold, but the only production recorded has been about three carloads of copper-lead ore, one carload of lead-zinc-silver ore, and about twenty tons of antimony ore, mostly during World War I (Vanderburg, 1940). The Claudia mine, on the southern boundary of the study area, produced a total of 25.8 oz gold, 144 oz silver, 262 lb copper, and 943 lb lead in 1919 and 1947. The Prodigal mine, within the southern portion of the study area, produced 1.43 of oz gold, 213 oz of silver, and 648 lb of copper in 1923. The Snowdrift mine is located one-half mile south of the South Jackson Mountains WSA. It produced small amounts of antimony just before and just after World War I, amounting to about 1,200 lbs (Lawrence, 1963).

The Jackson Creek mining district includes the northern part of the study area, and has a total production of about 1,000 tons of copper ore (Sorenson and others, 1987). The Jackson Queen and Humboldt King properties, both within the study area, have been explored since the early 1900s but the only production has been a little copper ore from the Humboldt King. The Harrison Grove (New Northern Light) mine, about 1 mi north of the WSA, was patented in 1907. No information is available on production (Hamilton, 1987).

The Red Boy mine, just outside of the study area produced a total of 1 oz gold, 748 oz silver, 49 lb copper, 5,073 lb lead, and 12,446 lb of zinc in two years of operation, 1940 and 1948 (Sorenson and others, 1987).

There is a block of claims of about 150 claims held by Amax Gold in the east central and northeastern portions of the WSA. Another block of about 50 claims in the northern portion of the study area is held by Wescord Resources. There are about 200 other claims in smaller blocks in the area, many around King Lear Peak and Bliss Canyon (BLM records, July 1989). Oil and gas leases cover 5,332 acres in the WSA.

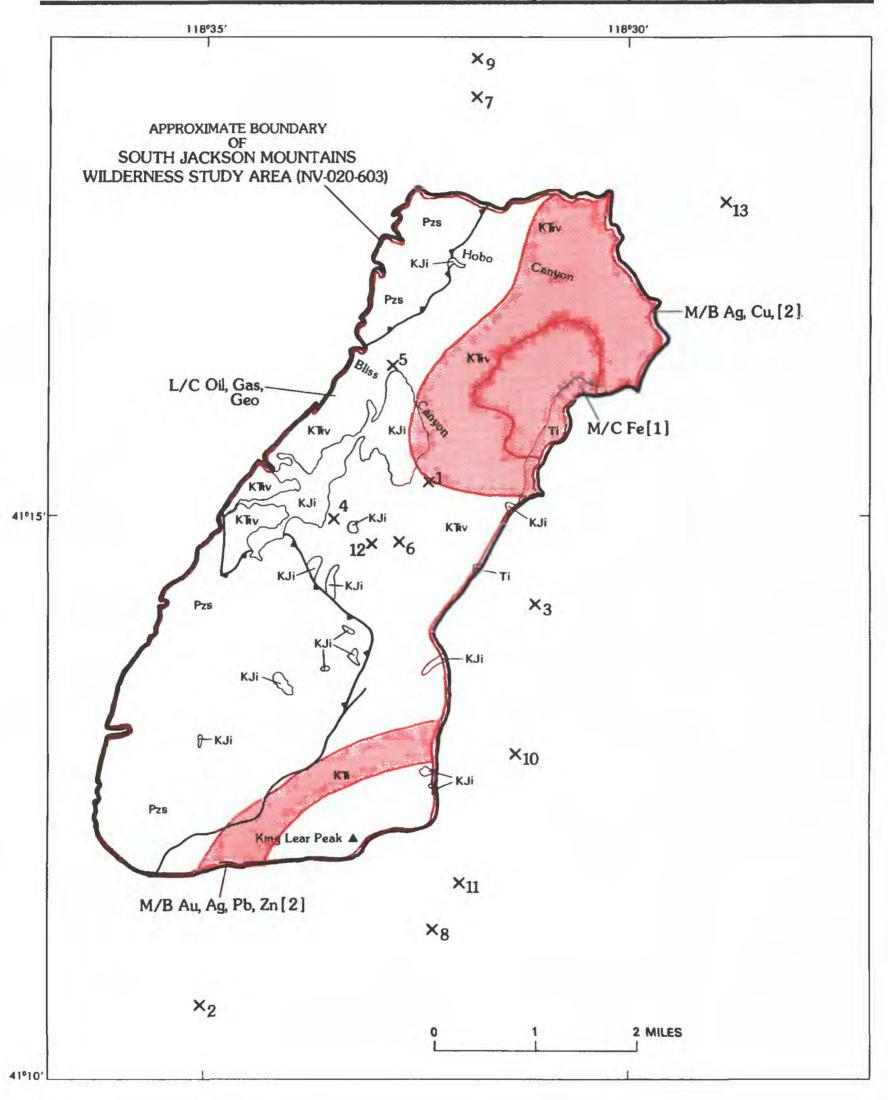
Mineral setting:

The study area is underlain mostly by marine sedimentary and volcanic rocks that have been complexly folded and faulted and intruded by dikes, sills, and small plugs.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 49,911 acres that constitute the balance.

References:

- Hamilton, M.M., 1987, Mineral resources of the South Jackson Mountains Wilderness Study Area, Humboldt, County, Nevada: U.S. Bureau of Mines open-file report MLA 10-87, 93 p.
- Higgins, L.R., Earnest, D.F., and Cox, A.D., 1988, Nevada BLM Wilderness Study Areas mineral potential handbook: Nevada Mining Association, Reno, Nevada, 257 p.
- Lawrence, E.F., 1963, Antimony deposits of Nevada: Nevada Bureau of Mines and Geology Bulletin 61, 248 p.
- Sorenson, M.L., Plouff, Donald, Turner, R.L., and Hamilton, M.M., 1987, Mineral Resources of the South Jackson Mountains Wilderness Study Area, Humboldt County, Nevada: U.S. Geological Survey Bulletin 1726-B, 14 p.
- Vanderburg, W.O., 1940, Reconnaissance of mining districts in Churchill County, Nev.: U. S. Bureau of Mines Information Circular 7093, 57 p.



Mineral resources of the South Jackson Mountains Wilderness Study Area.

	EXPLANATION
	Area with moderate mineral resource potential
	Area with low mineral resource potential
	endix 1 for definition of levels of mineral resource potential and certainty f assessment
	Commodities
Au	Gold
Ag	Silver
Cu	Copper
Fe	Iron
Pb	Lead
Zn	Zinc
Geo	Geothermal
000	Oil, Gas
[]]	Deposit types
1	Veins or replacement deposits associated with dioritic intrusion
2	Epithermal base- and precious-metal deposits
	Geologic map units
Ti	Intrusive rocks (Tertiary)
KJi	Intrusive rocks (Cretaceous and Jurassic)
Kħv	Volcanic and volcaniclastic sedimentary rocks (Cretaceous to Triassic)Includes Happy Creek Volcanic Complex, Boulder Creek beds of Russell (1981), and King Lear Formation
Pzs	Sedimentary rocks (Paleozoic)
-	- Contact
	- Normal fault
-	Thrust faultSawteeth on upper plate
×4	Mine or prospectSee table 1 for description
1	Mines and prospects
1	Avalanche prospect
2	Blue bird prospect
3	Clover prospect
4	Cold Springs prospect
5	Crystal prospect
6	Cuprite prospect
7	Humboldt King mine
8	Iron Girl prospect
9	Jackson Queen prospect
10	Red Boy mine
	A CONTROL OF THE CONT

Explanation, mineral resources of the South Jackson Mountains Wilderness Study Area.

Red Star prospect Shamrock prospect White Point prospect unnamed prospect

South McCullough Mountains

Area number:

NV-050-435

Size (acres):

56,623 of which 19,558 were studied at the request of the U.S. Bureau of

Land Management.

Status of mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (DeWitt and others, 1989).

Identified mineral resources (known):

No mineral resources have been identified within the Wilderness Study Area.

Mineral resource potential (undiscovered):

Five areas that make up 20 percent of the study areas have a moderate potential either for undiscovered silver, gold, lead, copper, and zinc resources in small vein deposits, for lanthanum and other rare-earth elements, uranium, thorium, and niobium in medium-size carbonate bodies and dikes, for tungsten and copper in small to medium-size vein deposits, or for silver and gold in small vein or breccia-pipe deposits. Six areas that make up 24 percent of the study area have an unknown resource potential either for gold, silver, lead, and copper in small vein deposits, for gold, silver, lead, zinc, copper, and arsenic in small vein deposits or small to medium-size breccia-pipe deposits, for lanthanum and other rare-earth elements, uranium, thorium, and niobium in medium sized carbonate bodies and dikes, or for tungsten and copper in small vein deposits. The designation of unknown resource potential for these areas is used because available geochemical data are not adequate to assign low, moderate, or high levels of resource potential, Four areas that make up 7 percent of the study area have a low resource potential either for tin, for tungsten and copper, or for copper, gold, silver, and arsenic in small vein deposits. The remaining 30 percent of the study area (areas covered by relatively young volcanic rocks are omitted) has a low resource potential for zinc, copper, silver, and gold, in medium-size to small stratabound deposits, or for niobium, tantalum, uranium, rare earth elements, and thorium in small pegmatite bodies, and an unknown potential for gold and silver in small to medium-size breccia pipes. The entire study area has no resource potential for oil and gas and coal, as well as low resource potential for these nonmetallic commodities: dimension stone; sand and gravel; pegmatite minerals such as feldspar and mica; and geothermal resources.

Mining activity:

There are no known active mines within the WSA. The McCullough Mining district is located along the western boundary of the WSA. Prospecting and exploration work in this area began as early as 1911 but there is no recorded production.

July 1989 BLM records show approximately 210 active and 20 inactive claims within or adjacent to the WSA.

Mineral setting:

The geologic history of the study area began in Early Proterozoic time with the accumulation of large amounts of siltstone and sandstone and minor amounts of basalt. During Middle Proterozoic time many mountain ranges in the area were intruded by granitic to syenitic stocks.

The Proterozoic rocks remained relatively undisturbed until early Paleozoic time, when they were covered by a sequence of limestone, sandstone, and shale that ranges in age from about 550 to about 50 Ma (Cambrian to Jurassic). Those Paleozoic to Mesozoic units have since been eroded from the McCullough Range, but are present in ranges to the west and north.

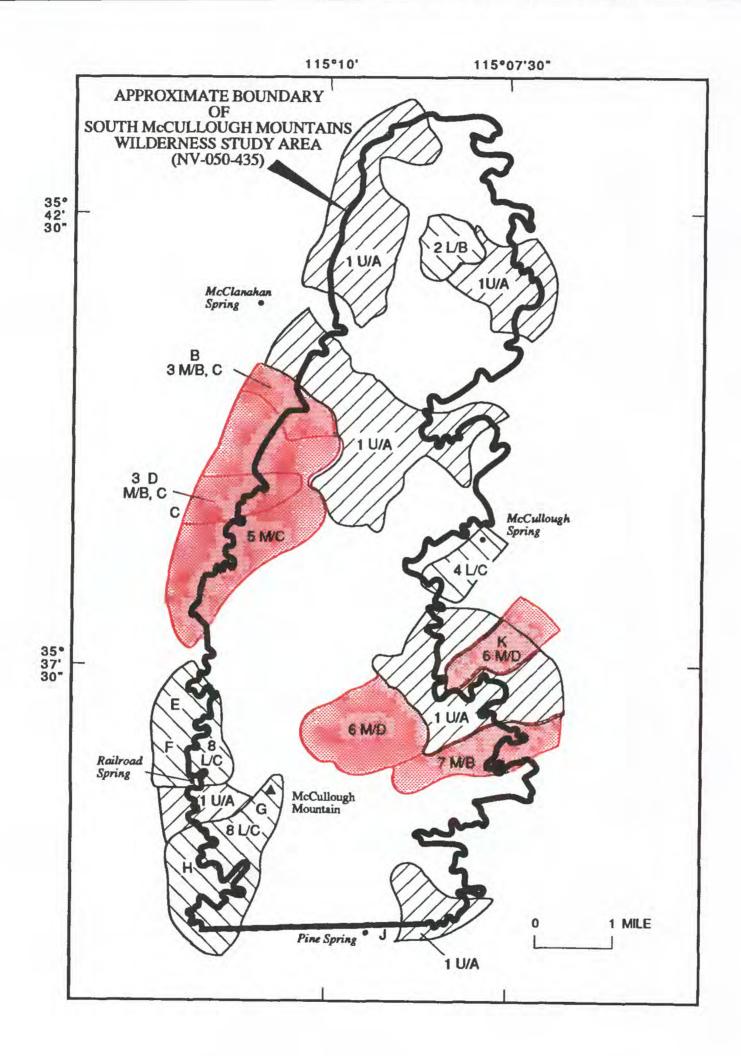
In Tertiary time, volcanic and volcaniclastic rocks covered the range. These rocks were faulted and eroded from much of the range. Erosion since middle Tertiary time has created deposits of sand and silt that flank the range.

Recommendations:

As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 37,065 acres that constitute the balance. Rocks similar to those in this study area have yielded important mineral deposits elsewhere in Nevada and Arizona. Detailed geologic and geochemical studies of this area are needed to determine whether similar deposits are present here.

References:

- Close, T. J., 1987, Mineral Resources of the South McCullough Mountains Study Area, Clark County, Nevada: U.S. Bureau of Mines Open File Report MLA 11-87, 22 p.
- DeWitt, Ed, Anderson, J. L., Barton, H. N., Jachens, R. C., Podwysocki, M. H., Brickey, D. W., and Close, T. J., 1989, Mineral resources of the South McCullough Mountains Wilderness Study Area, Clark County, Nevada: U.S. Geological Survey Bulletin 1730-C, 24 p.
- Longwell, C.R., Pampeyan, E.H., Bowyer, Ben, and Roberts, R.J., 1965, Geology and mineral deposits of Clark County, Nevada: Nevada Bureau of Mines and Geology Bulletin 62, 218 p.
- Nevada Mining Association, 1988, Nevada BLM Wilderness Study Areas, Mineral Potential Handbook: unpublished report.
- Sandberg, C.A., 1983, Petroleum potential of wilderness lands in Nevada: U.S. Geological Survey Circular 902-H, p. H1-H11.



Mineral resources of the South McCullough Mountains Wilderness Study Area.

[No geologic terrane having high mineral resource potential for any commodity was identified by this study. Except as designated below and except for that part covered by Tertiary volcanic rocks, entire area has low mineral resource potential, at certainty level C, for zinc, copper, silver, and gold in medium-size to small stratabound deposits. Same area also has low mineral resource potential, at certainty level C, for niobium, tantalum, uranium, rare-earth elements, thorium, and feldspar and mica in small pegmatite bodies. Same area also has unknown resource potential, at certainty level A, for gold and silver in small to medium-size breccia pipes. Entire study area has low mineral resource potential for sand and gravel, dimension stone, pegmatite minerals (feldspar and mica), and geothermal resources, at certainty level C. Entire study area has no mineral resource potential for oil and gas and coal, at certainty level D]

3 M/B, C 5 M/C 6 M/D

Geologic terrane having moderate resource potential for commodities listed in table below, at certainty levels B, C, or D—Number prefixes refer to areas listed in table below and in table 4



Geologic terrane having low resource potential for commodities listed in table below, at certainty level B or C— Number prefixes refer to areas listed in table below and in table 4



Geologic terrane having unknown resource potential, at certainty level A—Number prefixes refer to areas listed below and in table 4

Mineral sites within and adjacent to the study area

Levels of certainty

A

- Available data not adequate to estimate potential
- B Data indicate geologic environment and suggest level of resource potential
- C Data indicate geologic environment and give good indication of level of resource potential, but do not establish activity of resource-forming processes
- D Data clearly define geologic environment and level of resource potential and indicate activity of resourceforming processes in all or part of the area

Summary of areas having metallic mineral resource potential in and adjacent to the South McCullough Mountains Wilderness Study Area, Clark County, Nev.

[Commodities listed in order of relative importance; commodities underlined are considered to be byproducts or trace metals that could be recovered if deposits containing principal metals were mined; where variable sizes of deposits are shown, the most probable size is listed first; size of deposits listed below; <, less than]

Map area (pl. 1 and fig. 2)	Resource potential	Level of potential, level of certainty (see Appendix for explanation of symbols)	Commodities (listed in order of importance)	Size, type of deposit
All, except numbered	Low	L/C	Zn, Cu, Ag, Au	Medium to small, stratabound
areas below and part	Low	L/C	Nb, Ta, U, REE, Th	Small, pegmatite bodies
covered by Tertiary volcanic rocks	Unknown	U/A	Au, Ag	Small to medium, breccia pipe
1	Unknown	U/A	Au, Ag, Pb,, Cu	Small, vein
	Unknown	U/A	Au, Ag, Pb, Zn, Cu, As	Small, vein or breccia pipe
	Unknown	U/A	La, REE, U, Th, Nb	Medium, carbonatite bodies and dikes
	Unknown	U/A	W, Cu	Small, vein
2	Low	L/B	Sn	Small, vein
3	Moderate	M/C	Ag, Au, Pb, Cu, Zn	Small, vein
	Moderate	M/B	La, REE, U, Th, Nb	Medium, carbonatite bodies and dikes
4	Low	L/C	W, Cu	Small, vein
5	Moderate	M/C	La, REE, U, Th, Nb	Medium, carbonatite bodies and dikes
6	Moderate	M/D		Small to medium, vein
7	Moderate	M/B	W, Cu Ag, Au	Small, vein or breccia pipe
8	Low	L/C	Cu, Au, Ag, As	Small, vein

Small vein deposit = <10,000 tons
Medium-size vein deposit = 10,000-250,000 tons
Small stratabound deposit = <5 million tons
Medium-size stratabound deposit = 5 million-50 million tons
Small pegmatite deposit = <30,000 tons
Small breccia pipe deposit = <5 million tons
Medium-size breccia pipe deposit = 5 million-20 million tons
Medium-size carbonatite deposit = 5 million-20 million tons

Explanation, mineral resources of the South McCullough Mountains Wilderness Study Area.

South Pahroc Range

Area number: Size (acres):

NV-050-132 28,600

Status of

mineral surveys:

This wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Moring and others, 1988).

Identified mineral resources (known):

The South Pahroc Range study area has an indicated perlite resource of about 6 million tons. Samples were tested having expanded densities ranging from 1.63 to 4.56 lb/ft³ which is considered exceptional. Apache tears, prized by rock collectors, are abundant in the northeast corner of the area. They weather out of the perlite and litter the slopes below the outcrop.

Mineral resource potential (undiscovered): Geochemical analyses of jasperoid samples revealed that one part of the study area contains anomalous concentrations of gold, arsenic, and antimony and has a moderate mineral resource potential for disseminated gold. There is a low resource potential for oil and gas and no potential for geothermal energy resources in the study area. There is no mineral resource potential for perlite outside of the known reserves.

Mining activity: The Mackie Mine has been producing for 30 years averaging 300 tons/year of perlite. No production is recorded for the Kopenite Perlite Mine. There are five placer claims, probably for perlite, in the WSA according to July 1989 BLM records.

Mineral setting:

More than 95 percent of the study area consists of volcanic and sedimentary rocks of Tertiary age (see geologic time chart). The remainder is Paleozoic quartzite and carbonate rock and Quaternary alluvium.

Recommendations: No further work is recommended.

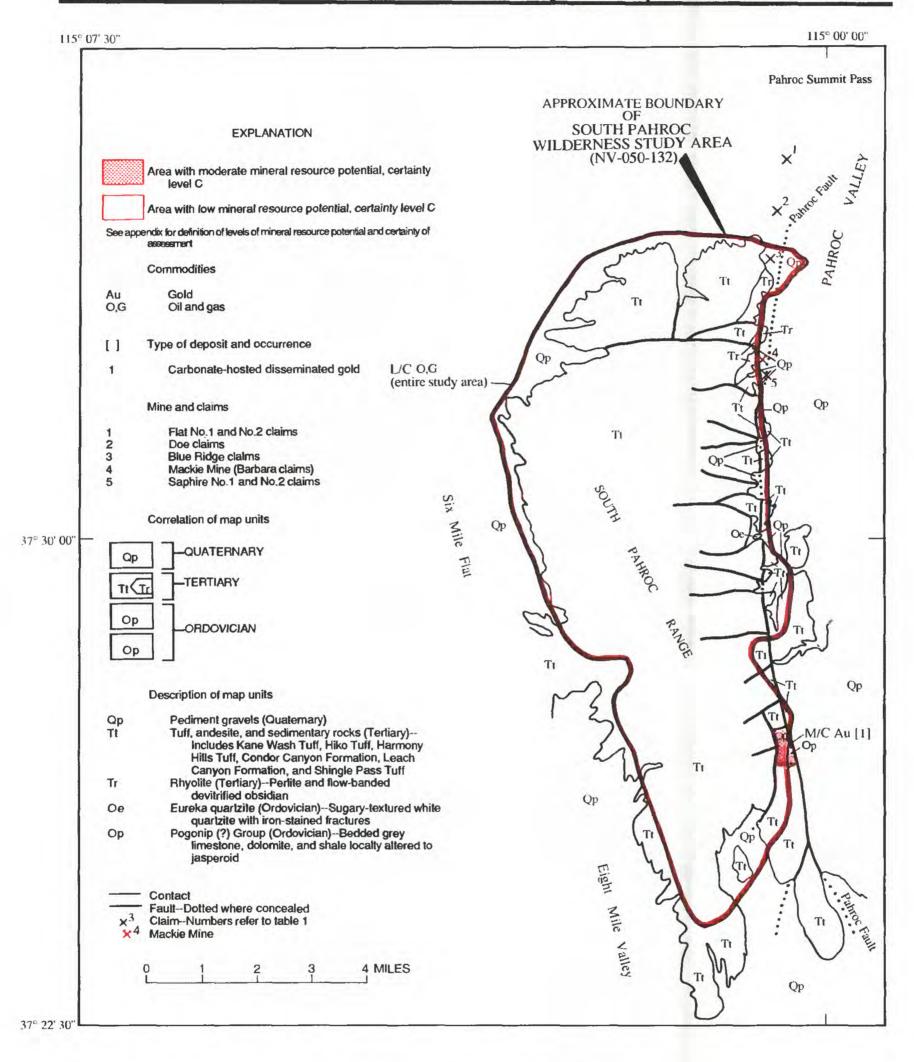
References:

Callaghan, E., 1937, Geology of the Delamar District, Lincoln County, Nevada: Nevada University Bull., V. 31, No. 5, 72 p.

Moring, B.C., Blank, H.R., Jr., Barton, H.N., and Neumann, T.R., 1988, Mineral Resources of the South Pahroc Range Wilderness Study Area, Lincoln County Nevada: U.S. Geol. Survey Bull. 1729-A, 12 p.

Neumann, T.R., 1986, Mineral Resources of the South Pahroc Range Wilderness Study Area, Lincoln County, Nevada: U.S. Bureau of Mines Open File Report MLA 56-86, 21 p.

Tshanz, C.M., and Pampeyan, E.H., 1970, Geology and Mineral Deposits of Lincoln County, Nevada: Nevada Bureau of Mines and Geology Bull. 73, 188 p.



Mineral resources of the South Pahroc Range Wilderness Study Area.

Area number:

South Pequop NV-010-035

Size (acres):

41,090 of which 34,544 acres were studied at the request of the U.S. Bureau of land Management.

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Status of mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Ketner and others, 1987).

Identified mineral resources (known):

A subeconomic resource of 250,000 tons of near-surface phosphatic rock at a grade of 16.4 percent P₂O₅ is present. Significantly larger tonnages of low grade material are present. Limestone suitable for agricultural uses (greater than 85 percent CaCO₃), and sand and gravel are available closer to market areas.

Mineral resource potential (undiscovered):

The geologic formations are mainly limestone and dolomite units, but one heterogeneous sequence, the Plympton Formation, includes beds of chert, shale, and phosphatic rocks. The area occupied by this formation is regarded as having a moderate mineral resource potential (likelihood of occurrence of undiscovered concentrations) for phosphate deposits. However, such deposits, if they exist, are not likely to be very large. In two areas within the study area, geochemical data suggest the possibility of concealed deposits of gold, silver, lead, zinc, and copper. The areas are regarded as having a moderate resource potential for these metals, but there is no indication of the grade or dimensions of these hypothetical deposits. Thermal history and structural conditions in the wilderness study area do not favor the formation and accumulation of oil and gas, and the study area is therefore regarded as having low energy resource potential for these commodities. Common limestone and dolomite underlie almost the entire area of the wilderness study area, but they are of poor quality for all uses except as road material. The resource potential of the study area for thick beds of high-purity limestone and dolomite is low. Common sand and gravel deposits are plentiful in the study area, but they are in now way unique, and no local demand is likely to materialize that cannot be supplied by deposits outside the study area. The study area has a low resource potential for specialty sand and gravel.

Mining activity:

No current mining claims are on record with the BLM; however, there are three small prospect pits within the northwestern corner of the WSA and one 150-ft-long trench on phosphate within the southwestern corner of the WSA. There is no recorded production from the WSA; the nearest mining district is the Spruce Mountain district, 3-10 mi to the southwest of the area.

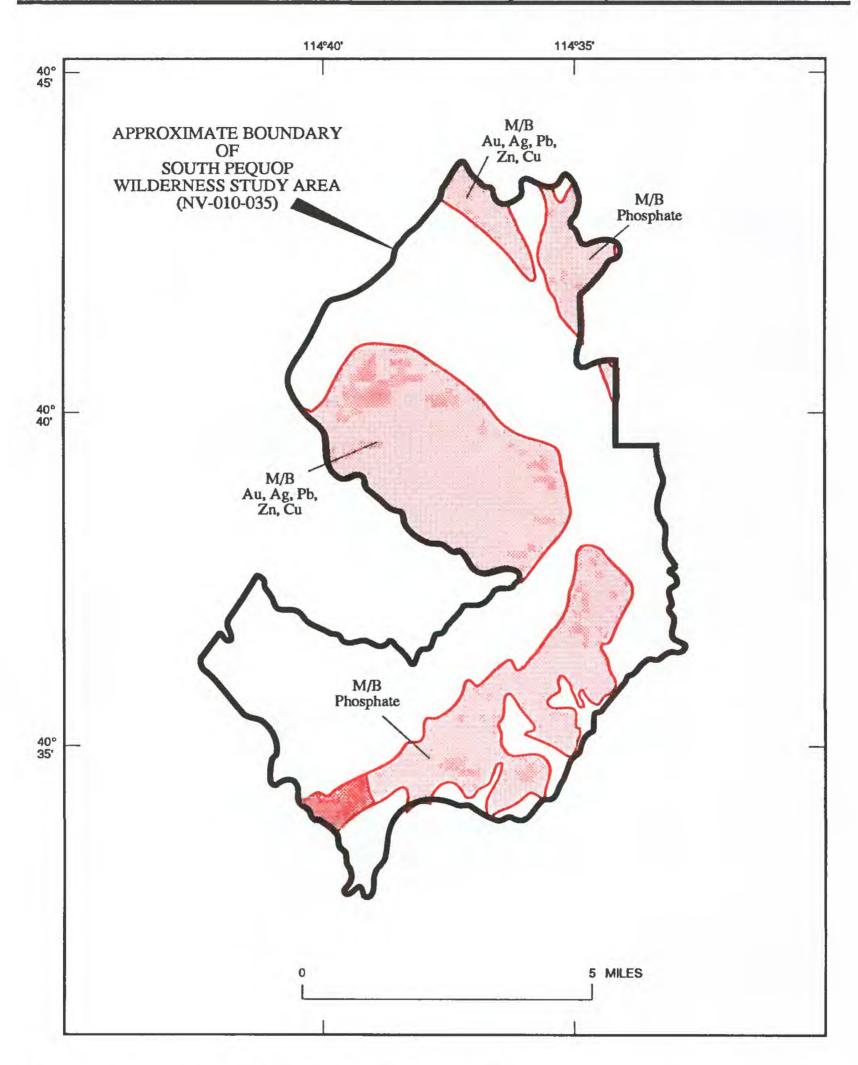
Mineral setting:

Geologic terrane in the wilderness study area is one principally of folded limestone and dolomite beds that form north-south-trending ledges and ridges. Among these predominantly carbonate beds is a stratigraphic unit known as the Plympton Formation, a heterogeneous sequence that includes chert, silty beds, shale, and phosphate beds. This formation is of interest because of its content of phosphorus, an essential ingredient of fertilizer. A small granitic intrusive stock is present in the central part of the area.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 6,546 acres that constitute the balance. Extensive surface and subsurface sampling are required to further evaluate the exact character of the phosphatic beds in the Plympton formation and the possible presence of precious-and-base-metal deposits along the northern WSA boundary.

References:

- Great Basin G-E-M Joint Venture, 1983, South Pequop G-E-M technical report: Prepared for the Bureau of Land Management under Contract No. YA-554-RFP2-1054, 26 p.
- Ketner, K.B., Gerlitz, C.N., Saltus, R.W., and Wood R.H., II, 1987. Mineral resources of the South Pequop Wilderness Study Area, Elko County, Nevada: U.S. Geological Survey Bulletin 1725-B, 16 p.
- Wood, R.H., II, 1985, Mineral Investigation of the South Pequop wilderness study area, Elko County, Nevada: U.S. Bureau of Mines Open-File Report MLA 35-85, 23 p.



Mineral resources of the South Pequop Wilderness Study Area.

EXPLANATION

2-2-4	Area of identified phosphate resources
M/B	Geologic terrane having moderate mineral resource potential for gold, silver, lead, zinc, and copper, with certainty level B
M/B	Geologic terrane having moderate mineral resource potential for phosphate, with certainty level B (outcrop area of Plympton Formation)

Explanation, mineral resources of the South Pequop Wilderness Study Area.

Area number:

South Reveille NV-060-112

Size (acres):

106,200 of which 33,000 were studied at the request of the U.S. Bureau of Land Management.

Status of

mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Diggles and others, 1986).

Identified mineral resources (known):

No mineral resources have been identified in the wilderness study area.

A 3-ft wide silver- and gold-bearing quartz vein is exposed at a shaft within 500 ft of the southern WSA boundary. A 2 mi² area at the southern tip of the WSA is altered, fractured, and contains anomalous arsenic concentrations.

Mineral resource potential

(undiscovered):

Field work and geochemical sampling revealed one mineralized area that lies astride the southern boundary of the study area. Most of the mineralized areas has low mineral resource potential for gold and silver in vein deposits, except for the central core, which has moderate resource potential for the same metals. There is no potential for oil and gas resources.

Mining activity:

Mining activity within the WSA has been limited to claim staking at the northern extreme of the WSA near the periphery of the Reveille mining district. The Reveille mining district is about 2 mi northwest of the WSA and produced about 8,200 tons of silver and lead ore worth about \$600,000 prior to 1920. The sedimentary rocks which host the ore deposits of the Reveille district are not exposed in the WSA. Depth to the sedimentary rocks, if they are present, is unknown.

Mineral setting:

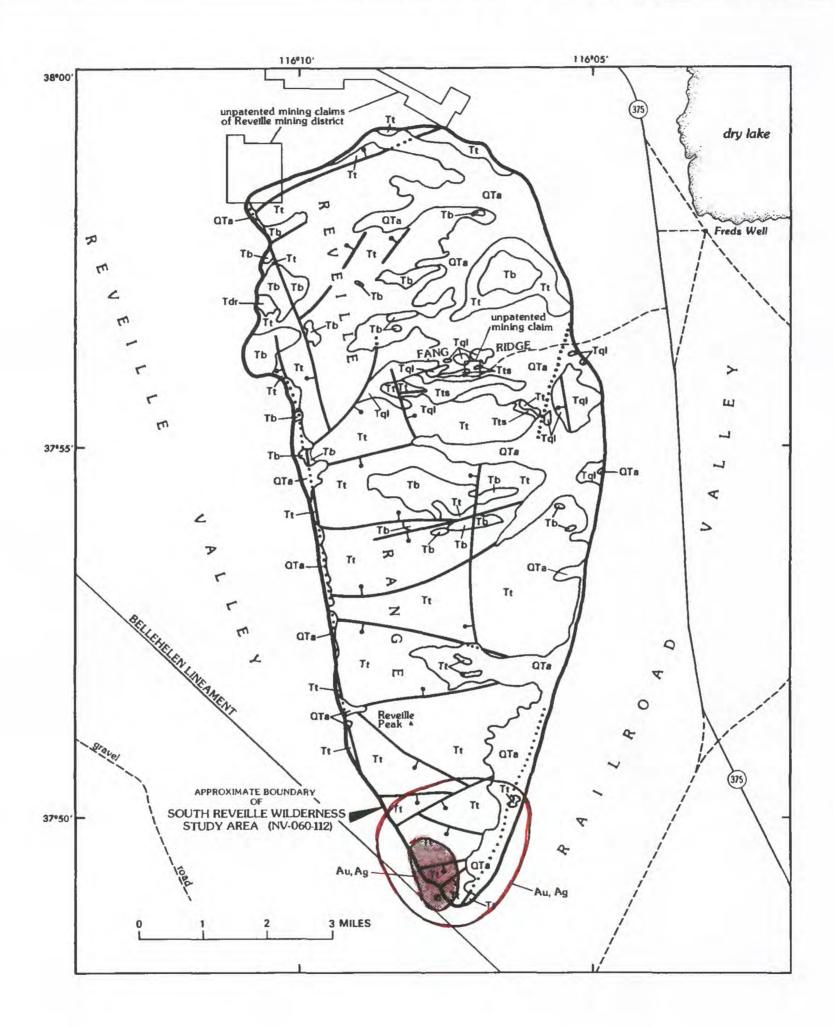
The Reveille Range, a north-northwest-trending uplifted fault block within the Basin and Range physiographic province, is bounded by the Reveille Valley graben on the west and by the Railroad Valley graben on the east. Rocks exposed in the range consist of Paleozoic (505 to 245 million years before present (Ma)) sedimentary strata and Tertiary (26.1 to 3.8 Ma) tuff and basalts (see Geologic Time Chart). The study area contains only Tertiary rocks.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 73,200 acres that constitute the balance. A detailed geochemical and geophysical exploration program in the southern 2 mi² of the WSA could reveal a drilling target for a large tonnage, low grade gold deposit.

References:

Diggles, M.F., Saunders, J.A., Ponce, D.A., Rochette, E.A., and Neubert, J.T., 1986, Mineral resources of the South Reveille Wilderness Study Area, Nye County, Nevada: U.S. Geological Survey Bulletin 1731-C, 11 p.

Neubert, J.T., 1985, Mineral investigation of the South Reveille Wilderness Study Area, Nye County, Nevada: U. S. Bureau of Mines Open File Report



Mineral resources of the South Reveille Wilderness Study Area.

EXPLANATION

GEOLOGIC TERRANE HAVING MODERATE MINERAL RESOURCE POTENTIALcertainty level C (M/C). See appendix 1 and figure 3 for definition of levels of mineral resource potential and certainty of assessment.

GEOLOGIC TERRANE HAVING LOW MINERAL RESOURCE POTENTIAL, certainty level B (L/B)

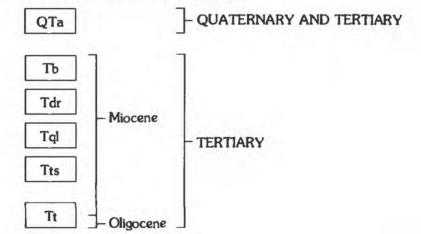
COMMODITIES

Ag Silver

CORRELATION OF MAP UNITS

Gold

Au



GEOLOGIC MAP UNITS

QTa Alluvium (Quaternary and Tertiary)

Tb Basalt (Miocene)

Tdr Dacite and Rhyolite (Miocene)

Tql Quartz latite (Miocene)

SHAFT

Tts Tuffaceous sedimentary rocks (Miocene)

Tt Tuff of Reveille Range (Miocene) and Monotony tuff, undivided (Oligocene)

MAP SYMBOLS

CONTACT

FAULT-Dotted where concealed, ball and bar on downthrown side

OIRT ROAD

Explanation, mineral resources of the South Reveille Wilderness Study Area.

Area number: Size (acres):

Stillwater Range NV-030-104 94,607



Status of mineral surveys:

This area was not studied by the U.S. Bureau of Mines or the U.S. Geological Survey.

Identified mineral resources (known):

No mineral resources have been identified within the Wilderness Study Area. The WSA includes a number of previously active mining districts (see Mining Activity section below).

Mineral resource potential (undiscovered):

This area has high potential for sediment-hosted gold deposits in Triassic shales near Fondaway Canyon; moderate potential for epithermal goldsilver veins of the Comstock-type (quartz-adularia) on the northeast side of the area near the Dixie-Comstock mine; moderate potential for copper skarn mineralization near White Cloud Canyon; moderate potential for tungsten mineralization (disseminated scheelite in marble) near Fondaway Canyon; low potential for simple antimony deposits in the Fondaway Canyon area; low potential for platinum-group elements associated with gabbroic rocks of the Humboldt Lopolith; low potential for replacement iron deposits in Jurassic volcanic rocks associated with the Humboldt Lopolith; low potential for copper-nickel veins and replacement mineralization in the Humboldt Lopolith; high potential for geothermal energy along the range front on the east side of the area (western edge of Dixie Valley); low or no potential for oil and gas resources; and low potential for industrial materials due to the distance from inhabited areas and lack of known occurrences of industrial materials. In addition, there is low potential for lead, zinc, mercury, and fluorspar.

Mining activity:

The White Cloud (or Coppereid) mining district is located in White Cloud Canyon, on the northeastern portion of the WSA. In the late 1800s, a mill in the district processed ore containing 26 percent copper in addition to small amounts of gold and silver, which was produced from local surface workings (Great Basin GEM Joint Venture, 1983, p. 14). There is nearly one square mile of patented claims in the White Cloud mining district.

The Dixie Comstock mine, in the northeastern portion of the WSA, was the major property in the Dixie Valley mining district. It produced some \$150,000 worth of gold and silver in the late 1930s (Vanderburg, 1940, p. 48). There are a number of patented claims southwest of the Dixie Valley district.

The Quick-Tung mine is in the Shady Run mining district, on the western side of the study area. It produced tungsten in 1960 from several short adits and shallow shafts (Lawrence, 1963, p. 37). Total production at the Quick-Tung has been 10,000 units of WO₃ (Willden and Speed, 1974). A gold heap leach operation is currently under way in Fondaway Canyon (Higgins, 1988).

The Cox Canyon district, on the southern border of the WSA, has produced minor amounts of gold from quartz veins in slate (Great Basin GEM Joint Venture, 1983, p. 33).

The IXL district, about one mile outside the southern boundary of the WSA, has produced a total of about \$20,000 in precious metals from epithermal veins (Great Basin GEM Joint Venture). According to U.S. Bureau of Mines Mineral Production Records, the Creore mine, about two miles south of the WSA, in the IXL mining district, produced a total of 12 tons of ore in 1953 and 1955. From this ore, 81 oz of silver, 560 lb of copper, 2,172 lb of lead, and 134 lb of zinc were recovered.

The Copper Kettle district, on the northern boundary, has been explored for iron.

The Rosebud prospect, located in the northernmost portion of the study area, has reportedly produced a small amount of mercury, probably 10 flasks or less which was used for retort testing (Benson, 1956, p. 36).

The Revenue Group, located in the southwestern portion of the area, produced 1,900 tons of 73 percent fluorspar in 1942 and 1952-57 (Great Basin GEM Joint Venture, 1983, p. 24; Willden and Speed, 1974, p. 50).

There are many claims and blocks of claims in and around all of them, over 1000 claims in all (BLM records, July 1989). About 35 percent of the WSA is claimed or leased for minerals. There are also some 11,000 acres of geothermal leases and 18,000 acres of oil and gas leases.

Mineral setting:

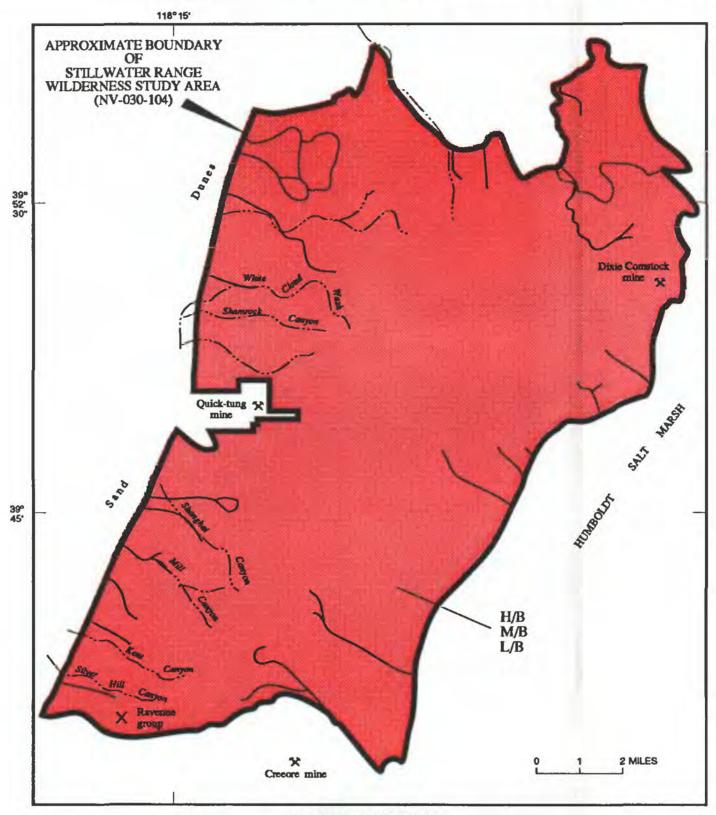
The southwestern part of this area is underlain by Triassic mudstone, siltstone, and limestone. These rocks are intruded by several small Tertiary granitic plutons, mainly between White Cloud and Fondaway Canyons. The northeast part of the area consists of mafic volcanic rocks and gabbroic rocks of the Jurassic Humboldt Lopolith. The Triassic and Jurassic rocks are overlain and faulted against middle Tertiary volcanic rocks, primarily Oligocene and Miocene ash-flow tuffs and Miocene basalts, and minor amounts of Miocene sedimentary rocks. These Tertiary age rocks cover most of the central part of the area. The area is bounded on its east side by the Dixie Valley fault, which was last active in 1954.

Recommendations: A large variety of mineral deposits occur along the edges of this area and may extend into the area. Evaluation of mineral resource potential requires additional geologic mapping, geochemical sampling, and geophysical studies to determine if these deposit types occur within the study area. This Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey.

References:

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- Great Basin GEM Joint Venture, 1983, Stillwater Range G-E-M Resources Area (GRA No. NV-04) Technical Report (WSA's NV 030-104 and 030-127): under contract YA-554-RFP2-1054, Reno, Nevada, 44 p.
- Higgins, L.R., Earnest, D.F., and Cox, A.D., 1988, Nevada BLM Wilderness Study Areas mineral potential handbook: Nevada Mining Association, Reno, Nevada, 257 p.
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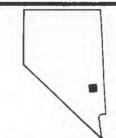


EXPLANATION

- H/B Geologic terrane having high mineral resource potential for gold with certainty level B
- M/B Geologic terrane having moderate mineral resource potential for gold, silver, copper, and tungsten with certainty level B
- L/B Geologic terrane having low mineral resource potential for antimony, platinum, palladium, iron, copper, nickel, oil and gas, lead, zinc, mercury, fluorspar, and sand and gravel with certainty level B

Mineral resources of the Stillwater Range Wilderness Study Area.

Area number: Size (acres): Table Mountain NV-040-197 35,958



Status of

mineral surveys:

This area has not been studied by the U.S. Bureau of Mines or the U.S.

Geological Survey.

Identified mineral resources (known):

No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential (undiscovered):

The presence of calderas, caldera-fill sequences, and post-caldera silicic domes and intrusive rocks, a geologic setting similar to that in the Atlanta district, 4 miles to the north, suggests that a moderate resource potential for epithermal precious metal deposits (gold and silver) and volcanogenic uranium resources may be present. The is low potential for hot springs manganese resources similar to those at the Lucky prospect, and low potential for perlite and diatomite. Geology similar to that in the Parsnip Peak Wilderness Study Area to the south suggests that low potential for arsenic, antimony, and mercury may also be present. There is low potential for oil and gas resources (Sandberg, 1983).

Mining activity:

The Atlanta mining district extends into the northern part of the WSA. Brecciated volcanic rocks host jasperoid-associated silver-gold mineralization.

July 1989 BLM records show four active mining claims in the WSA. The Sand Spring geothermal prospect occurs in the southern part of the area.

Mineral setting:

The geology consists of a complex stratigraphic sequence of mid-Tertiary intermediate and silicic ash-flow tuff, lava flows and associated calderafill deposits. The structural margin of the Mount Wilson caldera cuts through the area. Post-caldera rhyolite domes and associated intrusive rocks are common in the southern part of the area.

Recommendations:

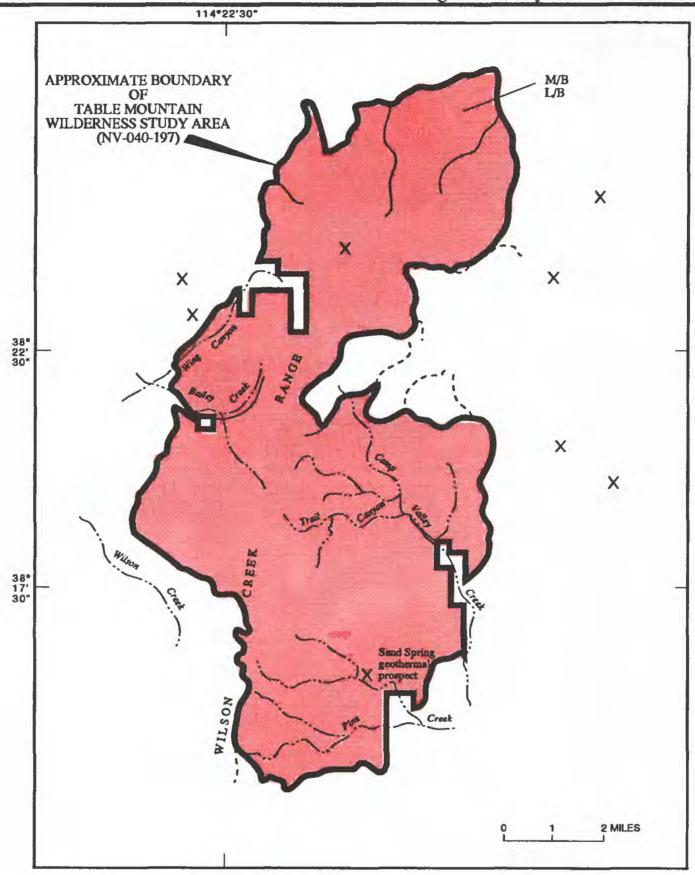
Because so little is known about the resource potential of the area, and since the geology suggests that mineral resources may exist, this area should be studied as part of a comprehensive mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines.

References

Best, M.G., Christiansen, E.H., and Blank, R.H., 1989, Oligocene caldera complex and calc-alkaline tuffs and lavas of the Indian Peak volcanic field, Nevada and Utah: Geological Society of America Bulletin, v. 101, no. 8, p. 1076–1090.

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- Toth, M.I., Stoneman, R.G., Blank, H.R., Jr., and Gese, D.D., 1987, Mineral resources of the Parsnip Peak Wilderness Study Area, Lincoln County, Nevada, Chapter D: U.S. Geological Survey Bulletin 1728-D, 13 p.
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EXPLANATION

- M/B Geologic terrane having moderate mineral resource potential for gold, silver, and uranium with certainty level B
- L/B Geologic terrane having low mineral resource potential for manganese, perlite, diatomite, arsenic, antimony, oil and gas, and mercury with certainty level B

Mineral resources of the Table Mountain Wilderness Study Area.

Area number: Size (acres): The Wall NV-060-163 38,000



Status of

mineral surveys:

The entire study area was studied by the U.S. Geological Survey and the U.S. Bureau of Mines (Diggles and others, 1986)

Identified mineral resources (known):

No metallic mineral oil and gas resources were identified. Basalt and cinders in the Lunar Crater Volcanic Field are sources of crushed stone.

Mineral resource potential (undiscovered):

The Wall Wilderness Study Area has low mineral resource potential for gold, silver, copper, lead, and manganese associated with caldera collapse. There is no evidence to indicate that alteration or mineralization of older collapse structures in the study area has taken place. This geologic environment is permissive for epithermal gold-silver-copper-lead-manganese mineralization similar to that occassionally associated with caldera fracture systems elsewhere in Nevada. However, McKee (1979) points out that such mineralization is usually the result of later hydrothermal-fluid circulation taking place along the pre-existing structure. There is low potential for oil and gas resources.

Mining activity:

No mining claims are present and no evidence of mining activity or prospecting was observed in the study area.

Mineral setting:

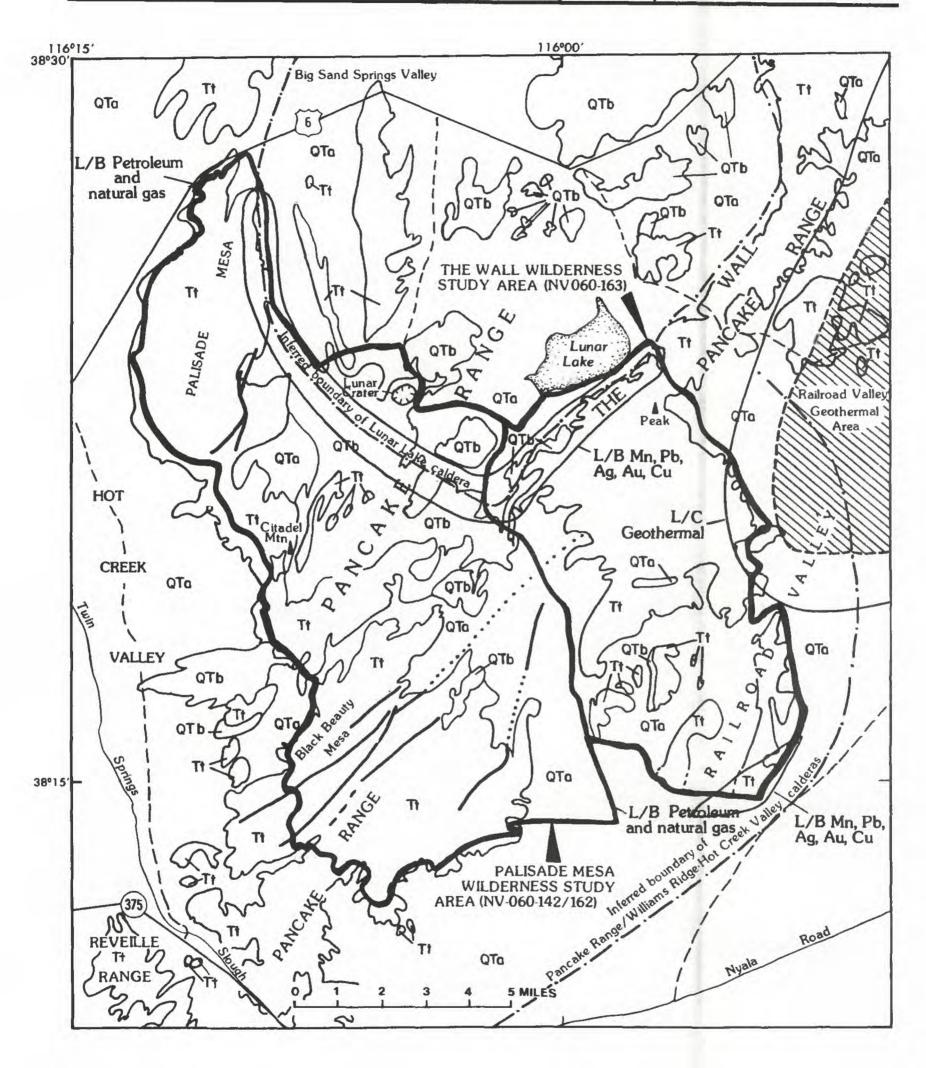
Silicic volcanic rocks of Tertiary age, basaltic flows of Tertiary and Quaternary age, and sediments of Tertiary and Quaternary age are the dominant stratigraphic units of The Wall Wilderness Study Area. The oldest rocks in the study area are 27 to 7 Ma (Ekren and others, 1971) and comprise thick sequences of felsic ash-flow tuffs. These are overlain by basaltic flows of the Lunar Crater volcanic field that range in age from 3.8 to 0.13 Ma (Turrin and others, 1985). About one third of the study area is covered with alluvium and colluvium deposits on pediment surfaces and with valley-fill, lake, and landslide deposits. These are two inferred caldera boundaries within and near the wilderness study area: the Pancake Range/Williams Ridge-Hot Creek Valley caldera boundary (Ekren and others, 1976), which lies outside of and encircles the wilderness study area; and the more striking structure known as The Wall, which Scott(1969) mapped as the edge of the Lunar Lake caldera.

Recommendations: No further work is recommended.

References:

Diggles, M.F., Nash, J. T., Ponce, D.A., Donald Plouff, and Kness, R.F., 1986, Mineral resources of the Palisade Mesa and The Wall Wilderness Study Areas, Nye County, Nevada: U.S. Geological Survey Bulletin 1731-B, p. B1-B12.

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- Ekren, E.B., Bucknam, R.C., Carr, W.J., Dixon, G.L., and Quinlivan, W.D., 1976, East-trending structural lineaments in central Nevada: U.S. Geological Survey Professional Paper 986, 16 p.
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- McKee, E.H., 1979, Ash-flow sheets and calderas: their genetic relationship to ore deposits in Nevada, in Chapin, C.E., and Elston, W.E., eds., Ash-flow tuffs: Seological Survey America Special Paper 180, p. 205-211.
- Scott, D.H., 1969, Geology of the southern Pancake Range and Lunar Crater volcanic field, Nye County, Nevada: unpublished Ph.D. thesis, University California-Los Angeles, 128 p.
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Mineral resources of The Wall Wilderness Study Area.

EXPLANATION AREA WITH LOW RESOURCE POTENTIAL-Commodities as shown. See appendix 1 and figure 3 for definition of levels of mineral resource potential COMMODITIES Petroleum and natural gas Geothermal Ag Silver Au Gold Cu Copper Mn Manganese Pb Lead CORRELATION OF MAP UNITS Holocene QUATERNARY AND TERTIARY Pleistocene and Pliocene Unconformity **TERTIARY** Tt - Miocene and Oligocene **DESCRIPTION OF MAP UNITS** Alluvium (Holocene, Pleistocene, and Pliocene) QТЬ Basalt (Pleistocene and Pliocene) Tt Tuff (Oligocene and Miocene) MAP SYMBOLS --- Contact-Dashed where approximately located Fault-Dashed where approximately located; dotted where concealed Boundary of Railroad Valley geothermal area Inferred caldera boundary

Geology from Ekren and others (1972) and Ekren and others (1973).

---- Dirt road

Area number: Size (acres):

Tobin Range NV-020-406Q

13,107

Status of

mineral surveys:

This area was not studied by the U.S. Bureau of Mines or the U.S.

Geological Survey.

Identified mineral resources (known):

The only identified mineral resources in or immediately adjacent to the study area are mercury and sand and gravel. Sand and gravel resources are suitable for local consumption.

Within the area are known occurrences of mercury, molybdenum,

fluorine, tungsten, barite, and zinc.

Mineral resource potential (undiscovered): The study area has low potential for undiscovered mineral resources of gold, silver, molybdenum, mercury, tungsten, barite, fluorite, and zeolite.

Mining activity:

An unknown quantity of mercury was produced from ore mined at the Last Chance Mine in the central part of the area. Immediately adjacent to but outside the area boundary to the south are several mines that reportedly have limited production of mercury, barite, fluorite, and zeolite. These mines are in the Mount Tobin Mining District (see BLM map).

July 1989 BLM records show 37 mining claims in or immediately adjacent to the WSA. Eighteen claims are in the central part of the area, Sec 14, 15, 22, and 23 of T. 29 N., R. 39 E; eight are in the northwestern part of the area; and the other 11 claims are in the southeastern part of the area. No major exploration activity is known.

Mineral setting:

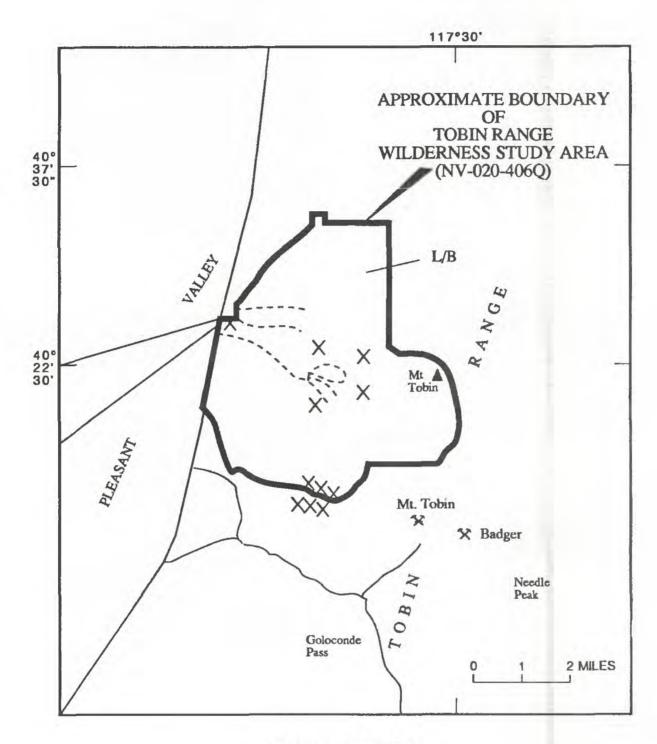
Most of the study area is underlain by upper Paleozoic and Triassic sedimentary and metamorphic rocks that consist of chert, argillite, shale, greenstone, and minor amounts of siltstone, sandstone, conglomerate, and limestone. In the north and southern parts of the study area, these rocks are overlain by lower Triassic silicic and intermediate flows and Tertiary andesite flows and flow breccias. Several northeast- and northwest-trending faults cut the study area.

Recommendations: This Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey.

References:

Nevada Mining Association, 1988, Nevada BLM Wilderness Study Areas; Mineral potential handbook: Nevada Mining Association, Reno, NV, unnumbered pages.

Vanderburg, W.O., 1936, Reconnaissance of mining districts in Pershing County, Nevada: U.S. Bureau of Mines Information Circular 6902, 57 p.



EXPLANATION

L/B Geologic terrane having low mineral resource potential for gold, silver, molybdenum, mercury, tungsten, barium, fluorspar, and zeolites with certainty level B

Mineral resources of the Tobin Range Wilderness Study Area.

Twin Peaks CA-020-619A

Area number: Size (acres):

90,791 of which 54,970 were studied at the request of the U.S. Bureau of

Land Management.

Status of

mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey

and the U.S. Bureau of Mines (Vercoutere and others, 1988).

Identified mineral resources (known):

The wilderness study area contains at least 30 million tons of subeconomic pozzolan resources and low-grade occurrences of gold, silver, copper, lead, zinc, nickel, molybdenum, zeolites, and clay.

Mineral resource potential (undiscovered): The study area has a moderate mineral resource potential for gold in hydrothermally brecciated basalt that is situated south of Mixie Flat in the north-central part of the study area. The entire study area has low mineral resource potential for copper, tungsten, and zinc.

Mining activity: The wilderness study area is not in a mining district nor has any mining activity been recorded. Nearby, about 30 mining claims were staked in 1911 and 1930 for an unknown commodity and two claims for diatomaceous silica; evaporites have been mined on a small scale. There are no current mining claims in the wilderness study area according to October, 1988, U.S. Bureau of Land Management records.

Mineral setting:

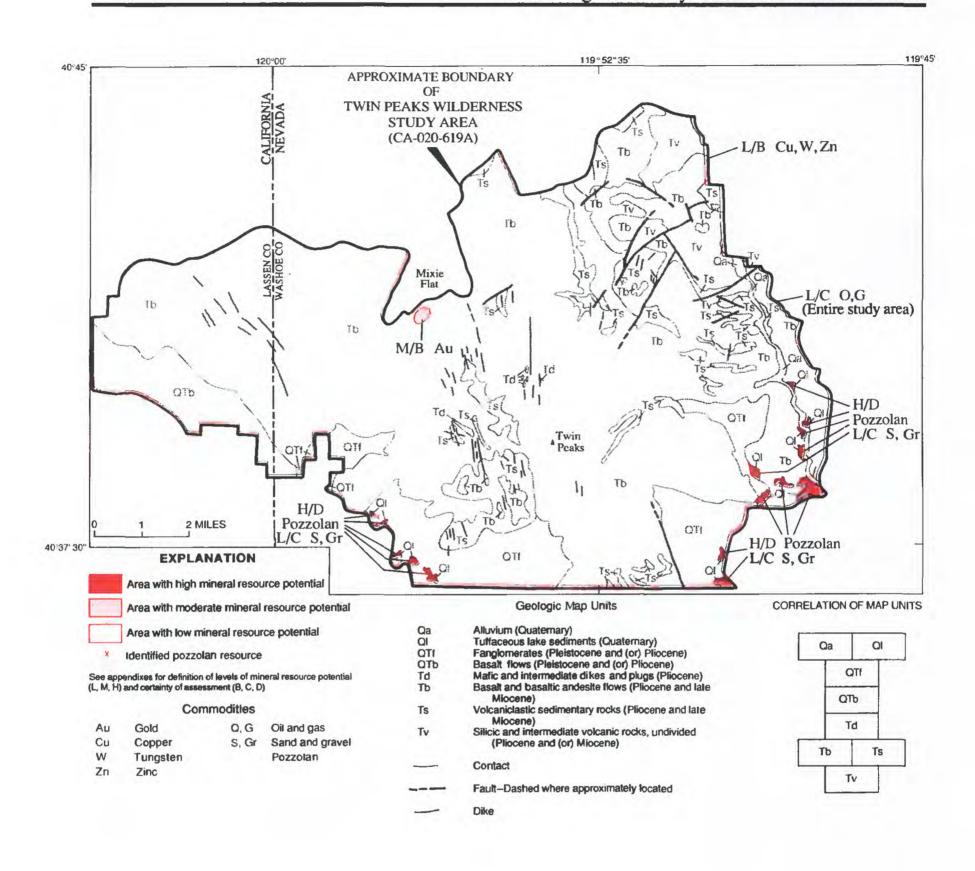
The study area lies in the southeastern part of the Modoc Plateau physiographic province. It is underlain by Tertiary and Quaternary rocks that are either directly or indirectly volcanic in origin. They consist predominantly of basaltic ans silicic flows, with mafic and intermediate dikes and plugs, and lenses of volcaniclastic sedimentary rocks intercalated within the basalt. Quaternary rocks are predominantly alluvial and lacustrine sedimentary deposits. An areally restricted stack of basalt of Pliocene to Pleistocene age is present in the western part of the study area.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 35,821 acres that constitute the balance. A detailed study of structures and altered rock in areas showing low-grade metal occurrences is recommended.

References:

Bonham, H.F., and Papke, K.G., 1969, Geology and mineral deposits of Washoe and Storey Counties, Nevada: Nevada Bureau of Mines Bulletin 70, 136 p.

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- Qualheim, B., 1979, Hydrogeochemical and stream sediment reconnaissance report for the Lovelock 1° x 2° NTMS quadrangle, Nevada: Lawrence Livermore Laboratory, University of California, Report UCRL 52677, U.S. Department of Energy contract number W-7405-ENG-48, GJBX-90-79, 16 p. with 37 p. of appendixes.
- Vercoutere, T.L., Sorensen, M.L., Frisken, J.G., Plouff, Donald, and Miller, M. S., 1988, Mineral resources of the Twin Peaks Wilderness Study Area, Washoe County, Nevada, and Lassen County, California: U.S. Geological Survey Bulletin 1706-A, 13 p.



Area number:

Virgin Mountain NV-000-ISA1

Size (acres):

6,560

Status of mineral surveys:

This area has been studied as part of mineral surveys by the U.S. Bureau of Mines and U.S. Geological Survey (Hose and others, 1981).

Identified mineral resources (known):

Known mineral occurrences include copper-, nickel-, palladium-, and platinum-bearing mafic and ultramafic dikes both within the northern half of the WSA and immediately to the north (Bancroft, 1910). Known resources occur at the Key West and Great Eastern Mines (Allsman, 1934; Needham, 1950). At least 140,000 tons of indicated and inferred tungsten resources occur at the Walker mine. Copper, lead, and zinc minerals occur at the Ranch View prospect in the southeastern corner of the WSA. However, inaccessible workings preclude resource definition. Known non-metallic resources include feldspar (in pegmatite dikes); extensive gypsum deposits; limestone; mica and beryl at and near the Walker property (Holmes, 1964). Extensive salt deposits occur to the west of the Virgin Mountains, in the Virgin River Valley and were mined in the 1860's.

Mineral resource potential (undiscovered):

The Virgin Mountains Instant Study Area has moderate potential for gold, silver, tungsten, copper, and nickel, in Precambrian rocks exposed in the northeastern and northwestern parts of the area. Low potential exists in these areas for associated cobalt, palladium and platinum. Scattered lead, copper, zinc, and molybdenum anomalies throughout the area indicate low potential for these metals. There is moderate potential for gypsum, beryllium, mica, and feldspar and low potential for building stone, uranium, geothermal energy, and oil and gas.

Mining activity:

The WSA includes the southern part of the Bunkerville or Copper King mining district which has lode and placer (Johnson, 1973) gold, silver, platinum, palladium, nickel, tungsten, base metals, and sheet mica production. Other prospects contain fluorite and uranium. Nickel was known as early as 1901, the Key West property was worked about 1903 and platinum was known to be an ore constituent as early as 1906 (Lincoln, 1923, p. 18). The WSA contains at least 12 mines and prospects, and two mines (Key West and Great Eastern) within one mile of the north boundary (Hose and others, 1981).

District production through 1962 includes at least 55 oz. of gold, 1347 oz silver, 10 oz platinum, 177 oz palladium, about 130,000 lbs copper, 26,597 lbs lead, approximately 1900 lbs nickel, about 3000 lbs of tungsten trioxide, and minor amounts of cobalt. This production has occurred from both within the WSA, the Key West Mine (Allsman, 1938), 1/2 mile north of the WSA, and the Great Eastern Mine 1 1/2 miles north of the WSA. Within the study area at least 3000 lbs of tungsten trioxide were produced from the Walker mine; and over 2000 lbs of sheet mica have been produced from the Mica Queen. Mica and beryl occurrences in pegmatites in the northeastern portion of the WSA have been prospected.

Industrial minerals within the WSA include 100 ft thick beds of gypsum, limestone, sandstone, and sand and gravel.

There is also reconnaissance exploration by at least 15 mining companies. Six companies (AMSELCO, Arizona Juneau Resources, Fischer Watt Gold Co., Inspiration Development Co., Intermountain Exploration, and Sierra Exploration, Inc.) hold lode mining claims in or near the WSA. Current exploration activity is focused on evaluating platinum bearing copper-nickel occurrences. These occurrences are associated with ultramafic dikes and sills in the northwest quarter of the WSA and immediately north of the WSA, near the Key West and Great Eastern mines. Within the last five years, at least 20 diamond drill holes have been drilled to evaluate this area.

July 1989 BLM records show mining activity within the WSA includes at least 200 lode claims. Oil and gas leases cover or have covered up to 2/3 of the WSA. Petroleum exploration in and north of the WSA includes geologic and seismic evaluations in 1979.

Mineral setting:

Mafic and ultramafic dikes are spatially associated with copper-nickelplatinum occurrences and ore bodies within Paleozoic sediments. Pegmatites contain significant beryl and sheet mica. The southern part of the WSA is covered by Mesozoic and Tertiary rocks which are uncut by mafic and ultramafic dikes, but may hide other platinum-nickel-cobalt bearing mafic and ultramafic dikes.

Recommendations:

Delineate tungsten resources at the Walker mine, determine the extent of cobalt-nickel-platinum-palladium resources near and in the WSA, evaluate all industrial minerals within the WSA.

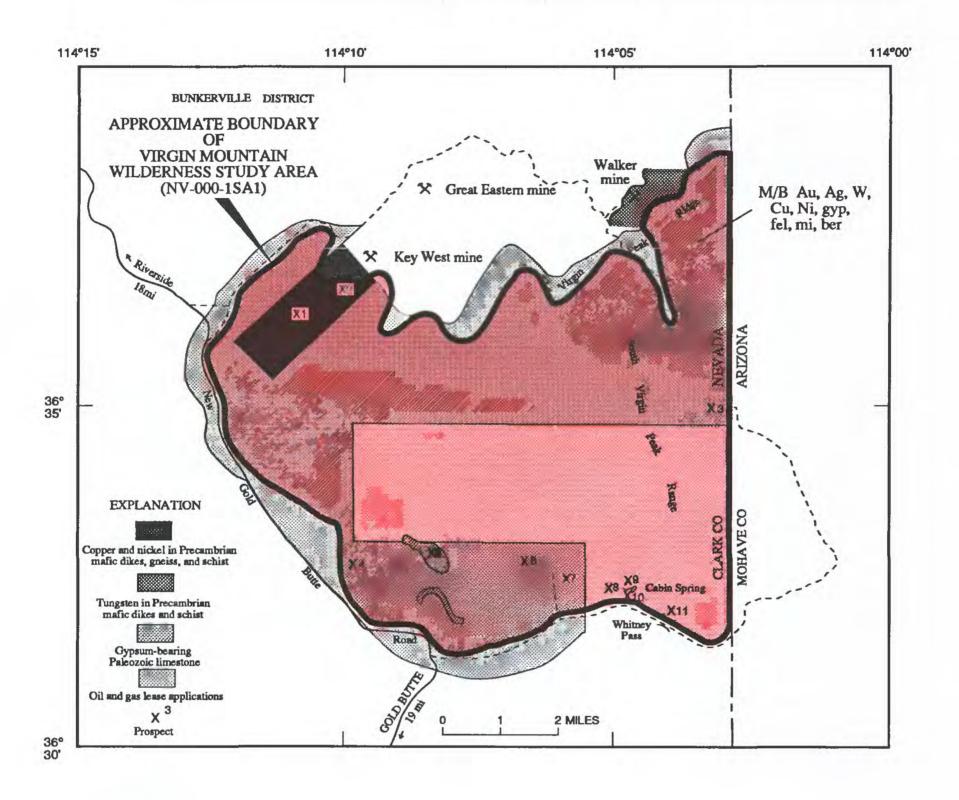
References:

Allsman, P.T., 1938, Cost of mining 55 tons of copper-nickel ore at the Great Eastern prospect, Bunkerville, Clark County, Nev.: U.S. Bureau of Mines Information Circular I.C. 7029, 9 p.

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Beal, L.H., 1965, Geology and mineral deposits of the Bunkerville District, Clark County, Nevada: Nevada Bureau of Mines Bulletin 63, 96 p.

- Holmes, G.H., 1964, Investigation of beryllium deposits in the northern Virgin Mountains of Clark County, Nev., and Mohave County, Ariz.: U.S. Bureau of Mines Report of Investigations 6572, 30 p.
- Hose, R.K., Carlson, R.R., Federspiel, F.E., and Huffsmith, J.D., 1981, Mineral resource potential of the Virgin Mountains Instant Study Area, Clark County, Nevada: U.S. Geological Survey Map MF 1204-B, scale 1:62,500
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- Knopf, Adolph, 1915, A gold-platinum-palladium lode in southern Nevada: U.S. Geological Survey Bulletin 620-A, p. 1-18.
- Lincoln, F.C., 1923, Mining districts and mineral resources of Nevada: Nevada Bureau of Mines and Geology, Nevada Newsletter Publishing Company, Reno, Nevada, 296 p.
- Longwell, C.R., Pampeyan, E.H., Bowyer, Ben, Roberts, R.J., 1965, Geology and mineral deposits of Clark County, Nevada: Nevada Bureau of Mines, Bulletin 62, 218 p.
- Needham, A.B., Soule, J.H., and Trengove, R.R., 1950, Investigation of the Great Eastern Deposit, Clark County, Nev.: U.S. Bureau of Mines Report of Investigation 4679, 5 p.
- Pierce, W.H., 1980, Pennsylvanian and Lower Permian stratigraphy and history of part of the Virgin Mountains area, northwest Arizona and southeast Nevada: Doctoral Dissertation, Colorado School of Mines, 394 p.



Mineral resources of the Virgin Mountain Wilderness Study Area.

Area number: Size (acres): Wall Canyon CA-020-805 46,305

Status of

mineral surveys:

This area was not studied by the U.S. Geological Survey or the U.S.

Bureau of Mines.



Identified mineral resources (known):

No mineral resources have been identified within the wilderness study area.

Mineral resource potential (undiscovered):

The study area has moderate mineral resource potential for gold, silver, and mercury associated with faults and felsic intensive rocks; moderate mineral resource potential for zeolites and moderate mineral resource potential for uranium, and lithium associated with the rhyolitic flows and ash-flow tuffs. Volcanic-derived sediments and lake deposits have moderate mineral resource potential for clay, zeolites, and pozzolan.

Mining activity:

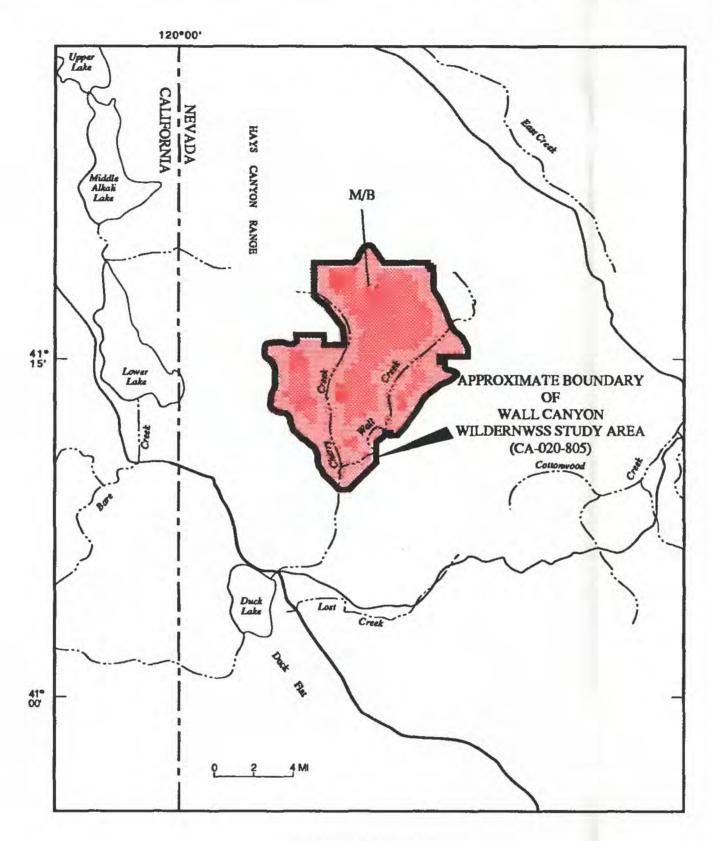
The wilderness study area is not in a mining district, and has had no known mineral production. However, U.S. Bureau of Land Management records, October 25, 1988, indicate that an area straddling the northwestern border of the wilderness study area contains at least 41 current claims, some of which are wholly or partially within the wilderness study area. The claims include the MC group (18 claims) in T. 39 N., R. 18 E., secs. 1 and T. 39 N., R. 19 E., sec. 6 owned by Tenneco; the West Aspen group (14 claims) in T. 39 N., R. 19 E., sec. 9 owned by W. Wright Parks III (Geologist, Reno, NV). Horizon Gold Shares apparently has consolidated most or all of the claims and has leased them to U.S. Borax Chemical Co., which is exploring the area for a hot springs-type gold deposit similar to the Hog Ranch mine, about 25 miles east. The Hog Ranch mine, which began production in 1986, is the first major gold mine in Washoe County, and its discovery has led to intense exploration by numerous individuals and companies in the region including the wilderness study area for similar deposits. There are no geothermal resources or sand and gravel nor are there any oil or gas leases in the wilderness study area.

Mineral setting:

Bedrock geology in the study area is dominantly volcanic, consisting of extensive basalt, andesite, and dacite flows, breccias, and intrusive phases, and rhyolitic flows and ash-flow tuffs. Minor volcanic derived sediments and lake deposits also occur in the area. Many north and northwest trending faults cut the south and west portion of the study area. Sediments are known to contain abundant vertebrate and plant fossils of Barstovian age.

Recommendations: The wilderness study area may host all or portions of one or more deposits of gold and other metals of high value. The wilderness study area should be studied as part of a comprehensive mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines. Future work in the study area, in the form of geologic mapping, detailed geochemical sampling and radiometric measurements is necessary to accurately assess the potential for hot springs-type gold, silver, and mercury mineralization associated with rhyolitic rocks, and potential for clay, zeolite, and pozzolan resources.

- Barringer Resources, Inc., 1982, Geochemical and geostatistical evaluation of wilderness study areas, Winnemucca district, northwest Nevada, 5 v.: Golden, Colo. (available from NTIS, U.S. Department of Commerce, Springfield, VA 22161, or call Information Center and Bookstore (202) 377-0365).
- Bonham, H.F., 1969, Geology and mineral deposits of Washoe and Story Counties, Nevada, with a section on Industrial mineral deposits by K.G. Papke: Nevada Bureau of Mines and Geology Bulletin 70, 140 p.
- Nevada Mining Association Bulletin, 1986, Western goldfield principals visit Hog Ranch project: v. 10, No. 6, 5 p.
- Muffler, L.J.P., ed., Assessment of geothermal resources of the United States-1978: U.S. Geological Survey Circular 790, 163p.
- Sandberg, C.A., 1983, Petroleum potential of wilderness lands in Nevada, in Miller, B.M., ed., Petroleum potential of wilderness lands in the western United States: U.S. Geological Circular 902-A-P, p. H1-H11.
- Turrin, B.D. Bergquist, J.R., Turner, R.L., and Plouff, Donald, 1988, Mineral Resources of the High Rock Canyon Wilderness Study Area, Washoe County, Nevada: U.S. Geological Survey Bulletin 1707-D, 14 p.
- U.S. Bureau of Land Management, 1988, Geographic index (of) all claims.
- U.S. Bureau of Mines, 1989, Mineral Industry Location System (MILS).



EXPLANATION

M/B Geologic terrane having moderate mineral resource potential for gold, silver, mercury, uranium, lithium, zeolites, clay, and pozzolan with certainty level B

Mineral resources of the Wall Canyon Wilderness Study Area.

Area number:

Size (acres):

Weepah Spring NV-040-246

61,137 of which 50,499 were studied at the request of the U.S. Bureau of

at the request of the U.S. B

Land Management.

Status of mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (du Pray and others, 1987)

Mines (du Bray and others, 1987).

Identified mineral resources (known):

Gold, silver, copper, mercury, and uranium occur within and near the wilderness study area. A small tonnage (3,300 short tons) silver resource with an average grade of 2.13 oz silver per ton was identified on the FNB mining claims within the northeastern part of the study area. Mercury was produced from the Red Head mining claims, within and adjacent to the study area, in the 1940's and 1950's. No resource could be delineated from available information. A jasperoid breccia and the adjacent Pilot Shale contain gold and/or silver and anomalously high amounts of arsenic, antimony, and mercury along the northwestern boundary. The geochemistry, host rocks, and alternation in this part of the study area are similar to those at the Alligator Ridge deposit, White Pine County, Nevada. The anomalously high arsenic, antimony, and mercury indicate an exploration target for a large-tonnage, low-grade disseminated gold/silver deposit within and to the west of the study area.

Mineral resource potential (undiscovered):

The mineral resource potential for metals in the study area is high in the northwestern part, where undiscovered deposits of disseminated gold and associated mercury may exist; moderate in two small areas in the eastern and southern parts, where epithermal vein deposits of gold, silver, copper, lead, and zinc may exist; and low for all metals in most of the study area. The resource potential for oil and gas, coal, uranium, and geothermal energy is low. The mineral resource potential for commodities with industrial applications is moderate in those parts of the study area underlain by surficial deposits and carbonate rock.

Mining activity:

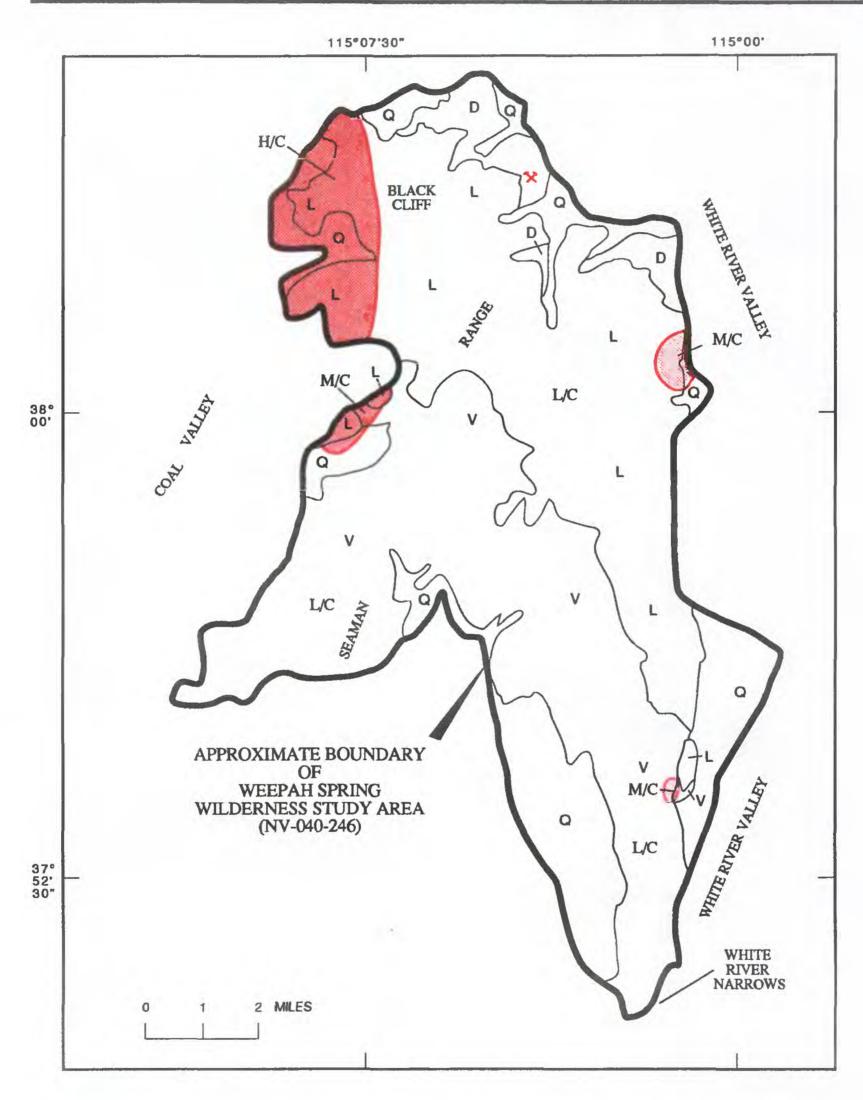
As of June 1984, mining activity within the WSA had consisted of claim staking, trenching, and drilling within and adjacent to the northwestern and western WSA boundaried. Most of the area west and northwest of the study area is covered by mining claims. Since the late 1960's, Bear Creek Mining Company, the exploration subsidiary of Kennecott Corporation, has mapped, sampled, and drilled in the Timber Mountain Pass area.

Mineral setting:

The Seaman Range is underlain by carbonate sedimentary rocks of Silurian through Mississippian age and by Tertiary volcanic rocks (see geologic time chart at end of report). The former occur throughout the northeastern part of the study area and the latter throughout the southwestern part. Surficial deposits are extensive in the southern part. Volcanic and sedimentary strata are locally offset along high-angle faults that are abundant in the area.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 10,638 acres that constitute the balance. Additional geologic mapping, bulk sampling, and drilling in the northwestern part of the study would be needed to identify a gold/silver deposit.

- Du Bray, E.A., Blank, H.R., Jr., Turner R.L., Gese D.D., and Harris, A.D., 1987, Mineral resources of the Weepah Spring Wilderness Study Area, Lincoln and Nye Counties, Nevada: U.S. Geological Survey Bulletin 1728-E, 11 p.
- Gese, D.D., 1988, Trace element distribution near jasperoids in the Weepah Spring Wilderness Study Area, Lincoln and Nye Counties, Nevada: U.S. Bureau of Mines Open-File Report OFR 12-88, 45 p.
- Gese, D.D., and Harris, A.D., 1985, Mineral resources of the Weepah Spring Wilderness StudyArea (NV-040-246), Nye and Lincoln Counties, Nevada: U.S. Bureau of Mines Open-File Report MLA 40-85, 52 p.



Mineral resources of the Weepah Spring Wilderness Study Area.

EXPLANATION

[Areas underlain by surficial deposits or carbonate rock have moderate resource potential, with level-C certainty, for limestone, dolomite, sand, and gravel, which may have industrial applications]

	white having subeconomic resources of shver
	Geologic terrane having high mineral resource potential, with level-C certainty, for disseminated gold deposits and associated mercury
	Geologic terrane having moderate mineral resource potential, with level-C certainty, for gold, silver, copper, lead, and zinc
	Geologic terrane having low mineral resource potential, with level- C certainty, for energy resources (entire study area) and all metals
Q	Surficial deposits
V	Volcanic rocks
D	Dolomite
L	Limestone
	Contact

Explanation, mineral resources of the Weepah Spring Wilderness Study Area.

White Rock Range

Area number:

NV-040-202/UT-040-216

Size (acres):

24,065



mineral surveys:

This wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Toth and

others, 1986).

Identified mineral resources (known):

No mineral resources are identified in the wilderness study area.

Mineral resource potential (undiscovered):

The White Rock Range Wilderness Study Area has low mineral resource potential for metals; the potential for oil and gas, coal, and geothermal energy is also low.

Mining activity:

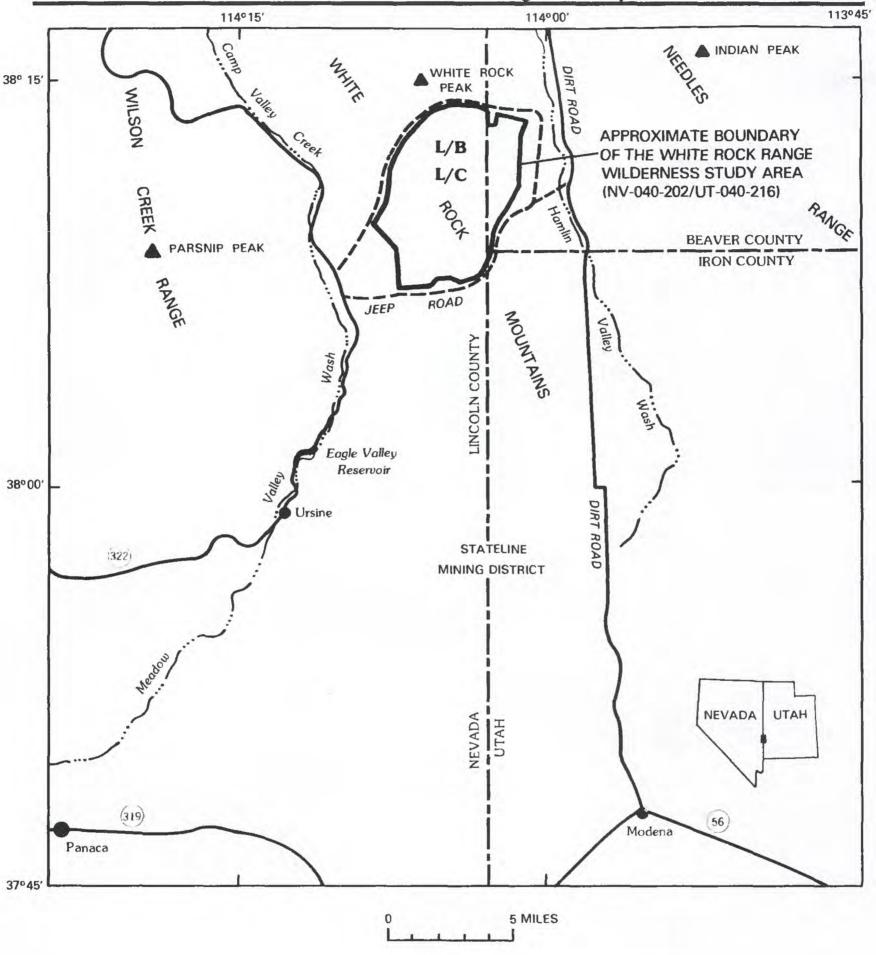
As of July 1984, no mining activity had taken place within the study area. Small gold-and silver-bearing breccia veins along faults in rhyolite are exposed in workings about 500 ft east of the study area, but are not known to occur in the WSA. Approximately 1 mi south gold and silver in large shear zones in the volcanic rocks were being recovered at a small cyanide heap-leach operation.

Mineral setting:

The White Rock Range Wilderness Study Area is along the eastern margin of the Basin and Range Province and is also within the Blue Ribbon lineament, a major east-trending structural zone in southern Nevada and Utah. In the study area and vicinity, widespread silicic volcanic rocks of Oligocene age unconformably overlie eroded remnants of deformed Paleozoic and Mesozoic sedimentary rocks; the northern end of the study area lies along the northeastern margin of the Wilson caldera. The study area contains a thick section of Oligocene volcanic rocks, flanked on the west by Tertiary lake sediments; extensive colluvial deposits are developed along the western and eastern sides. The volcanic rocks in the study area consist of the Lund Formation of the Needles Range Group, the tuff of Ripgut Springs, the Isom Formation, the Bauers Tuff Member of the Condor Canyon Formation, and tuff and rhyolite flows of the Blawn Formation. A veneer of andesite overlies the volcanic rocks near White Rock Peak, and rhyolite flows crop out just to the east of the study area. Many northeast- and northwest-trending faults crossing the area have offet from a few feet to more than several hundred feet; abundant springs commonly occur along the faults or at the intersection of faults.

Recommendations: No further work is recommended.

- Gese, D.D., 1985, Mineral resources of the White Rock Range Wilderness Study Area, Lincoln County, Nevada, and Beaver and Iron Counties, Utah: U.S. Bureau of Mines Open-File Report MLA 31-85, 12 p.
- Toth, M.I., Stoneman, R.J., Blank, H.R., Jr., and Gese, D.D., 1986, Mineral resources of the White Rock Range Wilderness Study Area, Lincoln County, Nevada, and Beaver and Iron Counties, Utah: U.S. Geological Survey Bulletin 1728-B, 14 p.



L/B Geologic terrane having low mineral resource potential for metals and geothermal energy, with certainty level B

EXPLANATION

L/C Geologic terrane having low mineral resource potential for oil, gas, and coal, with certainty level C

Mineral resources of the White Rock Range Wilderness Study Area.

Worthington Mountains

Area number:

NV-040-242

Size (acres):

47,633 of which 26,587 were studied at the request of the U.S. Bureau of

Land Management.

Status of

mineral surveys:

Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of

Mines (du Bray and others, 1986).

Identified mineral resources (known):

A silver-zinc-lead-copper resource of 825,000 short tons at a grade of 2.91 oz of silver per ton, 7.4 percent zinc, 1.95 percent lead, and 0.99 percent copper is present at the Smelter Shaft. Limestone suitable for agricultural uses (greater than 85 percent CaCO₃), high purity quartzite (99 percent SiO₂), and sand and gravel are present in the WSA, but are

available closer to market areas.

Mineral resource potential (undiscovered): Metallic-mineral (gold, silver, copper, lead, zinc, tungsten) resource potential within the study area is moderate in the northernmost part, and it is low in the remainder of the area. Energy resources are unknown;

accordingly, their resource potential is considered low.

Mining activity: The Freiberg mining district, at the northern end of the WSA, had production of 274 oz gold, 2,359 oz silver, 12,600 pounds lead, and 7,600 pounds zinc. Diamond core drilling was to be conducted by a claim owner near the northern border of the WSA in the fall of 1983, at the time of the field examination. According to the BLM, there is a pending (Sept.

1989) application to drill an area just north of the Smelter Shaft.

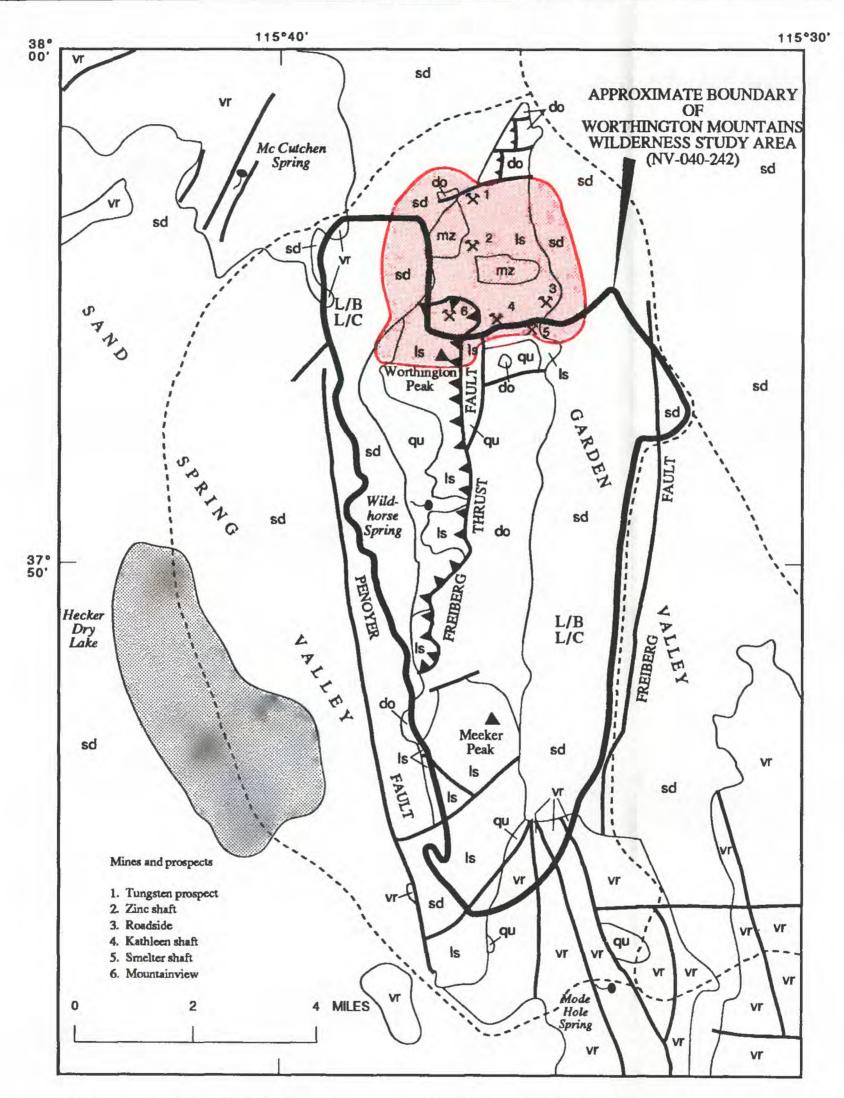
Mineral setting:

The Worthington Mountains are underlain by carbonate sedimentary rocks of Ordovician through Pennsylvanian age (see geologic time chart). A small amount of monzogranite crops out near the northern part of the map area, and Tertiary volcanic rocks crop out in the northwestern and southeastern corners of the map area. The most notable geologic structure in the area is the Freiberg thrust fault, along which are juxtaposed an allochthonous block of Ordovician Pogonip Group limestone and Ordovician Eureka Quartzite, and younger, upper

Paleozoic dolomitic rocks.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 21,046 acres that constitute the balance. Drilling and metallurgical testing is required to further evaluate the Smelter Shaft.

- Du Bray, E.A., Blank, H.R., Jr., and Wood R.H., II, 1986, Mineral resources, geology, and geophysics of the Worthington Mountains Wilderness Study Area, Lincoln County, Nevada: U.S. Geological Survey Bulletin 1728-A, 11 p.
- Great Basin G-E-M Joint Venture, 1983, Worthington Mountains G-E-M resource area technical report: prepared for the Bureau of Land Management under contract No. YA-554-RFP2-1054, 31 p.
- Tschanz, C.M., and Pampeyan, E.H., 1970 Geology and mineral deposits of Lincoln County, Nevada: Nevada Bureau of Mines Bulletin 73, 187 p.
- Wood, R.H. II, 1985, Mineral resources of the Worthington Mountains wilderness study area (BLM NV-040-242), Lincoln County, Nevada: U.S. Bureau of Mines Open-File Report MLA 69-85, 47 p.



Mineral resources of the Worthington Mountains Wilderness Study Area.

EXPLANATION

[The entire study area contains identified resources of carbonate rock, quartzite, and sand and gravel, not shown on this map]

X Mine (Smelter shaft) having identified resources of copper, lead, zinc, silver, and minor gold Geologic terrane having moderate potential with level-B certainty for base (Cu-Pb-Zn)-and precious (Au-Ag)-metal deposits and (or) tungsten in scheelite-bearing tactite deposits L/B Geologic terrane having low resource potential for energy resources, with certainty level B—Applies to entire study area L/C Geologic terrane having low potential for all metallic mineral commodities, with certainty level C vr Volcanic rocks mz Monzogranite qu Quartzite do Dolomite Is Limestone Surficial deposits sd Contact Normal fault Thrust fault Mine or prospect 8 Unpaved road

Explanation, mineral resources of the Worthington Mountains Wilderness Study Area.

Yellow Rock Canyon

Area number:

CA-020-913A

Size (acres):

12,468

Status of

This area was not studied by the U.S. Geological Survey or the U.S. mineral surveys:

Bureau of Mines.

Identified mineral resources (known):

There are no known mineral deposits in the wilderness study area.

Mineral resource potential (undiscovered): The study area has moderate potential for gold, silver, and mercury. The same rock units to the east contain identified occurrences of gold, silver, and mercury, associated with rhyolitic tuff. There is a moderate potential for uranium and lithium for the eastern half of the study area. The entire study area has moderate potential for zeolite resources.

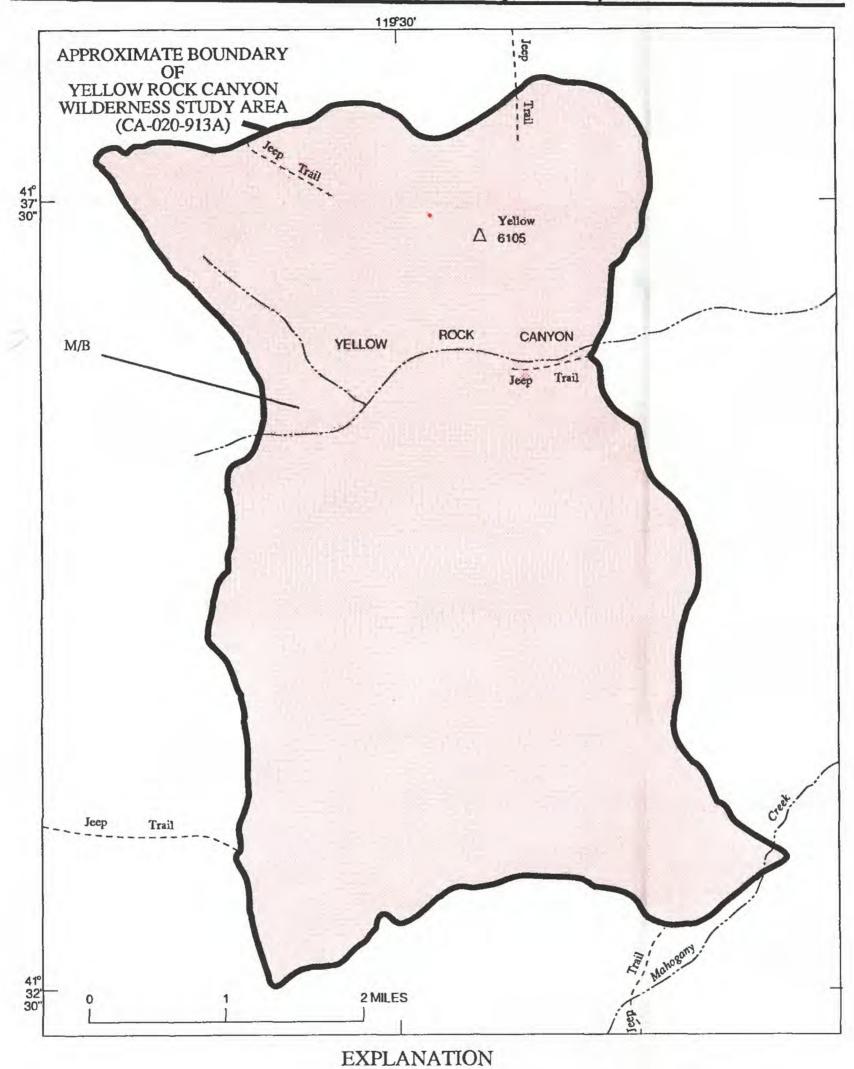
Mining activity: The wilderness study area is not in a mining district, and has had no known mineral production. However, exploration for mercury, including drilling and trenching, was conducted in the 1970's in T. 40 N., R. 22 E., sec. 8, an area that straddles the extreme northwest corner of the wilderness study area. The claims for mercury were abandoned in the 1970's, but since then, the explored area has been claimed, abandoned, and reclaimed for gold. U.S. Bureau of Land Management claim records, October 25, 1988, indicate that sec. 8 contains 14 current claims (the Amalgam claim group), a few of which may be wholly or partially within the wilderness study area. The claim group is leased to American Copper and Nickel Co., Inc., Sparks, NV, which has since staked additional claims around the Amalgam claim group; some of the new claims are also apparently in the wilderness study area (Mel Lahr, Regional Manager, American Copper and Nickel Co., Inc., oral commun., February 2, 1989). The target is a hot springs-type gold deposit similar to the Hog Ranch mine, about 13 miles southeast. The Hog Ranch mine, which began production in 1986, is the first major gold mine in Washoe County. The great value of the Hog Ranch deposit has led to intense exploration by dozens of companies in the region including the wilderness study area for similar deposits. There are no geothermal resources or sand and gravel nor are there any oil or gas leases in the wilderness study area.

Mineral setting:

The study area consists of an extensive area of rhyolitic flows, domes, and ash-flow tuff, locally interfingered with volcanic derived shale, mudstone, and air-fall tuff.

Recommendations: Future work in the study area, in the form of geologic mapping, detailed geochemical sampling, and radiometric surveying, is necessary to accurately assesses the potential for hot springs-type gold, silver, and mercury mineralization, uranium and lithium, and zeolite resources. The wilderness study area should be studied as part of a comprehensive mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines.

- Bonham, J.F., 1969, Geology and mineral deposits of Washoe and Storey Counties, Nevada, with a section on industrial mineral deposits by K.G. Papke: Nevada Bureau of Mines and Geology Bulletin 70, 140 p.
- Connors, R.A., Robinson, M.L., Bukofski, J.F., Meyer, W.T., and Howarth, R. J., 1982, Geochemical and geostatistical evaluation (of) wilderness study areas, Winnemucca district, northwest Nevada: prepared under contract YA-553-CT1-1096 for the U.S. Bureau of land Management by Barringer Resources, Inc., v. 1-5, 72 p.
- Keith, W.J., Turner, R.L., Plouff, Donald, and Peters, T.J., 1987, Mineral resources of the Little High Rock Canyon Wilderness Study Area, Humboldt and Washoe Counties, Nevada: U.S. Geological Survey Bulletin 1707-C, 17 p.
- Nevada Mining Association, 1988, Nevada BLM Wilderness Study Areas, Mineral Potential Handbook: Reno, Nevada, unnumbered pages.
- Peters, T.J., Munts, S.R., and Miller, M.S., 1987, Mineral resources of the Little High Rock Canyon study area, Humboldt and Washoe Counties, Nevada: U.S. Bureau of Mines Open-File Report MLA 16-87, 39 p.
- U.S. Bureau of Land Management, 1984, Eagle Lake/Cedarville study areas Draft Environmental Impact Statement: U.S. Bureau of Land Management, Susanville (CA) District Office, 340 p.



M/B Geologic terrane having moderate mineral resource potential for gold, silver, mercury, uranium, lithium, and zeolites with certainty level B

Mineral resources of the Yellow Rock Canyon Wilderness Study Area.

GEOLOGIC TIME CHART

Terms and boundary ages used by the U.S. Geological Survey in this report

EON	ERA	PERIOD		EPOCH	AGE ESTIMATES OF BOUNDARIES IN MILLION YEARS (Ma
				Holocene	0.010
	Cenozoic	Quaternary		Pleistocene	1.7
		Tertiary	Neogene	Pliocene	S
			Subperiod	Miocene	24
			Paleogene Subperiod	Oligocene	38
				Eocene	SS
				Paleocene	66
		Cretaceous		Late Early	
					96
				Larry	138
		Mesozoic Jurassic Triassic		Late	1.00
	Mesozoic			Middle	
				Early	205
DI.				Late	
				Middle Early	
					~240
		Permian		Late	290
Phanerozoic				Early	
		Carboniferous Periods	0	Late Middle	
			Pennsylvanian	Early	~330
			Mississippian	Late Early	
		Devonian Silurian Ordovician Cambrian		Late Middle	
	Paleozoic			Early	
				Late	410
				Middle	500
				Early	
				Late	
				Middle	
				Early	
				Late	
				Middle	
				Early	
Proterozoic	Late Proterozoic				1~570 900
	Middle Proterozoic				1600
	Early Proterozoic				2500
	Late Archean				3000
Archean	Middle Archean			,	3400
Aichean	Early Archean				3400
	Latin Michell				

¹Rocks older than 570 Ma also called Precambrian, a time term without specific rank. ²Informal time term without specific rank.

Figure 4. Geologic time chart.